The Journal of the Society of Dyers and Colourists

Volume 76



Number 10

CONTENTS

PROCEEDINGS OF THE SOCIETY THE Use of Colour in Cosmetics	(D. F. Anstead)	573
COMMUNICATIONS		
Some Physical Properties of Chen Viscose Rayon Filament Yarn	and the same of th	
VISCOSE RATON FILAMENT TARN	(D. H. Morton and C. Beaumont)	578
COPE—A CARD-OPERATED PROCESS		
PRIMARILY INTENDED FOR THE C		
	(I. R. Reynolds)	584
CORRESPONDENCE		587
NOTES		589
COLOUR INDEX CORRECTIONS		590
OBITUARY NOTICES		592
NEW BOOKS AND PUBLICATIONS		593
A DOTED A CYTO		200

THE SOCIETY OF DYERS AND COLOURISTS DEAN HOUSE PICCADILLY BRADFORD YORKSHIRE

PUBLICATIONS AVAILABLE FROM THE SOCIETY OF DYERS AND COLOURISTS DEAN HOUSE 19 PICCADILLY BRADFORD 1 YORKSHIRE

JOURNAL OF THE SOCIETY OF DYERS AND COLOURISTS (published monthly)

Price to Non-members per annum £5 5s

SECOND EDITION OF THE COLOUR INDEX

Price £40 per set of four volumes

THE THEORY AND PRACTICE OF WOOL DYEING (Second Edition)

By C L BIRD Price 15s

IDENTIFICATION OF DYES ON TEXTILE FIBRES AND DETECTION OF METALS IN FIBROUS MATERIALS, DYES, AND ORGANIC PIGMENTS
(Second Edition)

By ELLIS CLAYTON Price 10s 6d

REPORTS OF THE COMMITTEES ON THE DYEING PROPERTIES OF DIRECT COTTON, VAT, AND WOOL DYES

Price 5s

RECENT ADVANCES IN THE COLOURING OF MAN-MADE FIBRES
Proceedings of a Symposium held at Buxton in September 1957

Price £2

BLEACHING, DYEING, AND FINISHING TO-DAY

Proceedings of a Symposium held at Portrush, Northern Ireland in September 1955

Price f.1 10s

TEXTILE PRINTING

Proceedings of a Symposium held at St. Annes-on-Sea in September 1953

Price £1 10s

STANDARD METHODS FOR THE ASSESSMENT OF THE COLOUR FASTNESS OF TEXTILES (Third Report of the Fastness Tests Co-ordinating Committee) Price 7s 6d

(First Supplement Price 3s 6d)

LABORATORY COURSE IN DYEING
By C H GILES Price 17s 6d (plus 8d postage)

THE DYEING AND FINISHING OF HALF HOSE AND OTHER FOOTWEAR

By ARVED DATYNER Price 7s 6d

REVIEW OF TEXTILE PROGRESS

Volume II 1949 £1 Volume II 1950 £1 5s

Volume III 1951 Volume IV 1952 Volume V 1953
£1 15s each (£1 8s to S.D.C. & T.I. Members)

Volume VI 1954 £1 17s 6d (£1 10s to S.D.C. & T.I Members)

Volume VII 1955 Volume VIII 1956 Volume IX 1957
£2 2s each (£1 13s to S.D.C. & T.I Members)

(postage extra on each volume)

A S D C EXAMINATION

QUESTION PAPERS AND REPORT OF THE DIPLOMAS

EXECUTIVE SUB-COMMITTEE

1954 1955 1956 1957 1958 Price 1s each



Wool and Dielmoth go together...

All wool and wool blended articles can now be mothproofed with 'Dielmoth' at a very reasonable cost. 'Dielmoth' gives safe, durable protection against moth attack and customers now expect this additional safeguard.

People everywhere are asking the vital question 'Is it mothproofed with 'Dielmoth'?''. Manufacturers are finding that it pays to make sure the answer is 'Yes''.

Many of them have now linked their own trademark with the 'Dielmoth' symbol by using the 'Dielmoth' Design Service.

Information about the Design Service and about 'Dielmoth' generally is obtainable from the nearest Shell Chemical office.

SHELL CHEMICAL COMPANY LIMITED

LONDON
BIRMINGHAM
MANCHESTER
GLASGOW
BELFAST
DUBLIN

Villiers House, 41-47, Strand, London, W.C.2. Tel: Trafalgar 1277. Gloucester House, 65, Smallbrook, Ringway, Birmingham 5, Tel: Midland 8811. 144-146, Deansgate, Manchester 3, Tel: Deansgate 2411. Royal London House, 48-54, West Nile Street, Glasgow, C.1. Tel: City 3391. 16-20 Rosemary Street, Belfast, Northern Ireland, Tel: Belfast 26094,

33-34, Westmoreland Street, Dublin Republic of Ireland. Tel: Dublin 72114.

SHELL CHEMICALS

Knitwear by MERIDIAN LTD.

and protected with 'Dielmoth

DIELMOTH



DT.I

PUBLICATIONS AVAILABLE FROM THE SOCIETY OF DYERS AND COLOURISTS DEAN HOUSE 19 PICCADILLY BRADFORD 1 YORKSHIRE

JOURNAL OF THE SOCIETY OF DYERS AND COLOURISTS (published monthly) Price to Non-members per annum 45 5s

> SECOND EDITION OF THE COLOUR INDEX Price £40 per set of four volumes

THE THEORY AND PRACTICE OF WOOL DYEING (Second Edition) By C L BIRD Price 15s

IDENTIFICATION OF DYES ON TEXTILE FIBRES AND DETECTION OF METALS IN FIBROUS MATERIALS, DYES, AND ORGANIC PIGMENTS (Second Edition)

By ELLIS CLAYTON

Price 10s 6d

REPORTS OF THE COMMITTEES ON THE DYEING PROPERTIES OF DIRECT COTTON, VAT, AND WOOL DYES Price 5s

RECENT ADVANCES IN THE COLOURING OF MAN-MADE FIBRES Proceedings of a Symposium held at Buxton in September 1957 Price £2

BLEACHING, DYEING, AND FINISHING TO-DAY Proceedings of a Symposium held at Portrush, Northern Ireland in September 1955 Price £1 10s

TEXTILE PRINTING Proceedings of a Symposium held at St. Annes-on-Ses in September 1953 Price £1 10s

STANDARD METHODS FOR THE ASSESSMENT OF THE COLOUR FASTNESS OF TEXTILES (Third Report of the Fastness Tests Co-ordinating Committee) Price 7s 6d

(First Supplement Price 3s 6d)

LABORATORY COURSE IN DYEING By C H GILES Price 17s &d (plus &d postage)

THE DYEING AND FINISHING OF HALF HOSE AND OTHER FOOTWEAR By ARVED DATYNER Price 7s 6d

> REVIEW OF TEXTILE PROGRESS Volume I 1949 £1 Volume II 1950 £1 5 Volume III 1951 Volume IV 1952 Volume V 1953 £1 15s each (£1 & to 8.D.C. & T.I. Members) Volume VI 1954 £1 17s 6d (£1 10s to S.D.C. & T.I Members) Volume VII 1955 Volume VIII 1956 Volume IX 1957 £2 2s each (£1 13s to S.D.C. & T.I Members) (poetage extra on each volume)

ASDC EXAMINATION QUESTION PAPERS AND REPORT OF THE DIPLOMAS EXECUTIVE SUB-COMMITTEE 1954 1955 1956 1957 1958 Price 1s each



Wool and Dielmoth go together...

All wool and wool blended articles can now be mothproofed with 'Dielmoth' at a very reasonable cost. 'Dielmoth' gives safe, durable protection against moth attack and customers now expect this additional safeguard.

People everywhere are asking the vital question "Is it mothproofed with 'Dielmoth'?". Manufacturers are finding that it pays to make sure the answer is "Yes".

Many of them have now linked their own trademark with the 'Dielmoth' symbol by using the 'Dielmoth' Design Service.

Information about the Design Service and about 'Dielmoth' generally is obtainable from the nearest Shell Chemical office.

Knitwear by MERIDIAN LTD, and protected with 'Dielmoth'



SHELL CHEMICALS



SHELL CHEMICAL COMPANY LIMITED

Regional Offices:

Villiers House, 41-47, Strand, London, W.C.2. Tel: Trafalgar 1277.

Gloucester House, 65, Smallbrook, Ringway, Birmingham 5. Tel: Midland 8811.

144-146, Dearngate, Manchester 3. Tel: Dearngate 2411.

GLASGOW RELFAST

BUBLIN 33-34, Westmoreland Street, Belfast, Northern Ireland. Tel: Belfast 26094.

33-34, Westmoreland Street, Dublin. Republic of Ireland. Tel: Dublin 72114.

Colne Vale Dye & Chemical Co Ltd

MILNSBRIDGE

HUDDERSFIELD

Manufacturers of Aniline Dyes

We specialise in the accurate matching of customers' shades and samples

Telephone Milnsbridge 3

Telegrams ANILINE HUDDERSFIELD

CHAS FORTH & SON

LIMITED

CHEMICALS
for Dyers & Bleachers
ACIDS ALKALIES SOAPS



DYESTUFFS

for all purposes
DYEWOOD EXTRACTS HEMATINES

Telephone 75147 & 75148 NO

NEW BASFORD NOTTINGHAM

Telegrams
DELTA NOTTINGHAM



Telephone Dudley Hill 253 and 254 (Private Branch Exchange)

Telegrams BISULPHITE BRADFORD

J B WILKINSON (CHEMICALS) LTD

ESTABLISHED 1882

Manufacturers of CHEMICALS for DYERS, BLEACHERS, TANNERS, TEXTILES and all INDUSTRIAL PURPOSES

DUDLEY HILL CHEMICAL WORKS BRADFORD 4

ALSO LOCAL STOCKISTS OF A LARGE RANGE OF ICI PRODUCTS

FORTHCOMING MEETINGS OF THE SOCIETY

Tuesday, 25th October 1960

LEEDS JUNIOR BRANCH. Printing Inks. L. J. Watkinson, Esq., Ph.D. (Universal Printing Inks Ltd.). The Lecture Theatre, Department of Colour Chemistry and Dyeing, The University, Leeds 2. 3.15 p.m.

Wednesday, 26th October 1960

MIDLANDS SECTION. Influence of Newer Fibres on Beam Dyeing. P. J. Dolby, Esq., B.Sc. (Imperial Chemical Industries Ltd.). Kings Head, Loughborough.

Thursday, 27th October 1960

MANCHESTER JUNIOR BRANCH. Modern Machinery Developments. J. V. Horsley, Esq. (Mather & Platt Ltd.). Room J/E.11, Jackson Street Extension, College of Science and Technology, Manchester. 4.30 p.m.

Monday, 31st October 1960

Bradford Junior Branch. Fibre Identification. F. W. Lindley, Esq., Ph.D., and C. Beaumont, Esq., B.Sc., A.R.I.C., A.T.I., A.S.D.C. (Courtaulds Ltd.). Institute of Technology, Bradford. 7.15 p.m.

Tuesday, 1st November 1960

Scottish Section. A New Understanding of Skittery Dyeing and Its Practical Significance. H. R. Hadfield, Esq., M.Sc. (Tech.), and D. R. Lemin, Esq., B.Sc. (Hons.) (Imperial Chemical Industries Ltd.). Room 24, Royal College of Science and Technology, Glasgow. 7.15 p.m.

Wednesday, 2nd November 1960

Scottish Junior Branch. Fibre Identification— a lecture demonstration. F. W. Lindley, Esq., Ph.D. and C. Beaumont, Esq., B.Sc., A.R.I.C., A.T.I., A.S.D.C. (Research Laboratory, Courtaulds Ltd.). Technical College, George Street, Paisley. 7.30 p.m.

Thursday, 3rd November 1960 WEST OF ENGLAND AND SOUTH WALES SECTION. Paper Chromatography of Dyestuffs. J. C. Brown, Esq., B.Sc., A.R.I.C. (CIBA Clayton Ltd.). County Hotel, Taunton. 6.30 p.m.

Friday, 4th November 1960

LONDON SECTION. Fastness of Dyes and Finishes. A. J. Lenz, Esq. (Director of the Retail Trading-Standards Association Testing House). Royal Society, Burlington House, London W.1. 6 p.m.

Tuesday, 8th November 1860
LEEDS JUNIOR BRANCH. The Technological Aspects in the Manufacture of Food Dyes. J. B. Wilkinson, Esq., B.Sc. (Williams (Hounslow) Ltd.). The Lecture Theatre, Department of Colour Chemistry and Dyeing, The University, Leeds 2. 3.15 p.m.

NORTHERN IRELAND SECTION. Application and Uses of the Synthetic Vinyls in the Textile Industry. J. H. MacGregor, Esq., Ph.D., F.R.I.C. (Courtaulds Ltd.). Grosvenor Rooms, Belfast. 7.30 p.m.

Thursday, 10th November 1960 Dyeing and its Practical Significance. H. R. Hadfield, Esq., M.Sc. (Tech.) and D. R. Lemin, Esq., B.Sc. (Hons.). (Imperial Chemical Industries Ltd.). The Victoria (Imperial Chemical Industries Ltd.). The Hotel, Bridge Street, Bradford. 7.30 p.m.

Hotel, Bridge Street, Braulors.

Tuesday, 15th November 1960

HUDDERSFIELD SECTION. A New Understanding of Skittery Dyeing and Its Practical Significance. H. R. Hadfield, Esq., M.Sc.(Tech.) and D. R. Lemin, Esq., B.Sc.(Hons.). Huddersfield. 7.30 p.m.

Yarns. Dr. J. W. S. Hearle, M.A., A. Inst.P., F.T.I. (College of Science and Technology, Manchester). Joint meeting with the Textile Institute. Technical College, George Street, Paisley. 7.30 p.m.

Wednesday, 16th November 1960

MIDLANDS SECTION. Skittery Dyeing. H. R. Hadfield, Esq., M.Sc. (Tech.), and D. R. Lemin, Esq., B.Sc. (Hons.). (Imperial Chemical Industries Ltd.). (Joint meeting with the Leicester Branch of The Guild of Technical Dyers.) College of Art and Technology, Leicester. 7 p.m.

Thursday, 17th November 1960

HUDDERSFIELD SECTION. Annual Dinner. Whiteley's Cafe, Huddersfield.

MANCHESTER JUNIOR BRANCH. Recent Developments in Dyeing Acrylic Fibres. B. Kramrisch, Esq., F.R.J.C., F.T.I., F.S.D.C. (CIBA Clayton Ltd.). Room J/E.11, Jackson Street Extension, College of Science and Technology, Manchester. 4.30 p.m.

MANCHESTER SECTION. The Dyeing of Courtelle—Some Aspects of Practical Bulk Dyeing and Finishing. J. S. Ward, Esq., B.Sc. (Courtaulds Ltd.). Lecture Theatre, Manchester Literary and Philosophical Society, 36 George Street, Manchester 1. 7 p.m.

George Street, Manchester 1. 7 p.m.

Tuesday, 22nd November 1960

Bradford Junior Branch. The Dyeing of Courtelle. K. Meldrum, Esq., B.Sc., A.R.I.C. (Courtaulds Ltd.). Institute of Technology, Bradford. 7.15 p.m.

LEEDS JUNIOR BRANCH. Some Difficulties in the Colouring of Plastics. J. M. J. Estevez, Esq., B.Sc., F.R.I.C., A.P.I. (I.C.I. Ltd., Plastics Division). The Lecture Theatre, (I.C.I. Ltd., Plastics Division). The Lecture Theatre, Department of Colour Chemistry and Dyeing, The

University, Leeds 2. 3.15 p.m.

Scottish Section. The Rôle of Hydrogen Peroxide, Peracetic Acid and Sodium Chlorite in Bleaching. L. A. Chesner, Esq., B.Sc., A.T.I. (Laporte Chemicals Ltd.). St. Enoch Hotel, Glasgow. 7.15 p.m.

Thursday, 24th November 1960
WEST RIDING SECTION. Fibre Identification—a lecture demonstration. F. W. Lindley, Esq., Ph.D., and C. Beaumont, Esq., B.Sc., A.R.I.C., A.T.I., A.S.D.C. (Courtaulds Ltd., Droylsden). The Hotel Metropole, King Street, Leeds. 7.30 p.m.

Thursday, 1st December 1960

NORTHERN IRELAND SECTION. The Procion Resin Process.
I. D. Rattee, Esq., B.Sc., A.R.C.S. (Imperial Chemical Industries Ltd.). Grosvenor Rooms, Belfast. 7.30 p.m.

Friday, 2nd December 1960

LONDON SECTION. Dyeing Furnishing Fabrics in London.
R. Hawthorn, Esq. (Henry W. Gibbs Ltd.) (Joint meeting with the London Section of The Textile Institute.) Royal Society, Burlington House, London W.1. 6 p.m.

Monday, 5th December 1960

MANCHESTER JUNIOR BRANCH. High Polymers. Professor C. E. H. Bawn, C.B.E., F.R.S. (University of Liverpool). Room J/E.11, Jackson Street Extension, College of Science and Technology, Manchester. 4.30 p.m.

Wednesday, 7th December 1960

Bradford Junior Branch. The Principles of Colour Photography. C. W. Taylor, Esq. (Ilford Ltd.). Institute of Technology, Bradford. 7.15 p.m.

Thursday, 8th December 1960

Scottish Junior Branch. Recent Developments in the Application of Dyes to Polyamide Fibres with special reference to Continuous Processes. R. E. Fletcher, Baq., B.Sc., A.T.I. (CIBA Clayton Ltd.). Technical College, George Street, Paisley. 7.30 p.m.

WEST OF ENGLAND AND SOUTH WALES SECTION. Application and Uses of the Synthetic Vinyls in the Textile Industry. J. H. MacGregor, Esq., Ph.D., F.R.I.C. (Courtaulds Ltd.). Park Hotel, Cardiff. 6.30 p.m.

Friday, 9th December 1960
WEST RIDING SECTION. Half-day Symposium on New Dyeing Techniques.

The Production of Fast Shades on Polyester Fibre and its Blends. D. Marian, Esq., M.Sc. (Compagnie Française des Matières Colorantes (Françolor), Paris). des Matteres Colorantes (Francolor), Paris).

Recent Developments in the Application of Dyes to Polyamide Fibres—"Acid Shock" Process. R. E. Fletcher, Esq., B.Sc., A.T.I. (CIBA Clayton Ltd.). The High-temperature Beam Dyeing of Terylene Fabrics. I. E. Haden, Esq., B.Sc., A.T.I. (Imperial Chemical Industries Ltd.). Institute of Technology, Bradford.

continued on page ly

FORTHCOMING MEETINGS OF THE SOCIETY - continued from page iii

Tuesday, 13th December 1960

Scottish Section. Modern Flow Principles and Machine Design. (With particular reference to package and high-temperature beam dyeing.) G. S. Helliwell, Esq. (Samuel Pegg & Son Ltd.). St. Enoch Hotel, Glasgow. 7.15 p.m.

Thursday, 15th December 1960

MANCHESTER SECTION. Ladies Evening. Carpets. The Great Hall, College of Science and Technology, Manchester. 7 p.m.

MIDLANDS SECTION. Half-day Symposium on Chemical

Stimulus and Response. G. W. Madaras, Esq., Ph.D. and

S. N. Bradshaw, Esq. Easy Care Finishes on Viscose Rayon. D. H. Ogden, Esq. B.Sc. (Tech.), A.M.C.T., A.R.I.C. (British Rayon Res. Assoc.).

Lubricants in Resin Finishing. R. W. Williamson, Esq. F.T.I., F.S.D.C. (Hickson & Welch Ltd.).

Chemistry of Resins. A. R. Smith, Esq., B.A., B.Sc., F.R.I.C. (B.I.P. Chemicals Ltd.).

Charge for symposium 2s. 6d. including afternoon tea. Daybrook House, Daybrook, Nottingham. 2.15 p.m.

Tuesday, 20th December 1960

HUDDERSFIELD SECTION. The Dyeing of Courtelle. J. S. Ward, Esq., B.Sc. (Courtaulds Ltd.). Silvios Cafe, Huddersfield. 7.30 p.m.

Tuesday, 10th January 1961

NORTHERN IRELAND SECTION. The Dyeing and Finishing of the Newer Synthetic Fibres as They Affect the Consumer.

J. S. Ingham, Esq., M.Sc., F.R.I.C., F.S.D.C. (Marks and Spencer Ltd.). Grosvenor Rooms, Belfast. 7.30 p.m.

Thursday, 12th January 1961
SCOTTISH SECTION. Recent Developments in Wool Dyeing.
D. G. Evans, Esq., B.Sc. (CIBA Clayton Ltd.). Scottish
Woollen Technical College, Galashiels. 7.30 p.m.

West RIDING SECTION. Modern Piece Scouring Methods in Relation to Uneven Dyeing. B. F. J. Moxon, Esq. (Wool Industries Research Association). The Victoria Hotel, Bridge Street, Bradford. 7.30 p.m.

Friday, 13th January 1961

LONDON SECTION. Fibre Identification— a lecture demonstration. F. W. Lindley, Esq., Ph.D., and C. Beaumont, Esq., B.Sc., A.R.I.C., A.T.I., A.S.D.C. (Courtaulds Ltd., Droylsden). (Joint meeting with the London Centre of the Guild of Dyers and Cleaners.) Royal Society, Burlington House, London W.1. 6.30 p.m.

Monday, 16th January 1961
BRADFORD JUNIOR BRANCH. Moths and Mothproofing.
A. Gabriel, Esq., B.Sc. (Shell Chemical Co. Ltd.).
Institute of Technology, Bradford. 7.15 p.m.

Tuesday, 17th January 1961

HUDDERSFIELD SECTION. Defending the Frontiers of Civilisation. J. David, Esq., B.Sc. (Tech.), A.M.C.T., A.T.I. (Catomance Ltd.). (Joint meeting with Halifax Textile Society.) Silvios Cafe, Huddersfield. 7.30 p.m.

LEEDS JUNIOR BRANCH. Moths and Mothproofing. A. Gabriel, Esq., B.Sc. (Shell Chemical Co. Ltd.). The Lecture Theatre, Department of Colour Chemistry and Dyeing, The University, Leeds 2. 3.15 p.m.

SCOTTISH SECTION. Continuous Dyeing of Synthetic Fibres and Their Blends with Other Fibres. J. Khacheyan, Esq. (C.F.M.C.). St. Enoch Hotel, Glasgow. 7.15 p.m.

Wednesday, 18th January 1961
MIDLANDS SECTION. (Title later). G. H. Lister, Esq.,
Ph.D. (Sandoz Ltd.). King's Head, Loughborough.

Thursday, 19th January 1961

ANCHESTER SECTION. Printing of Synthetic Fibres.
R. E. Fletcher, Esq., B.Sc., A.T.I. (CIBA Clayton Ltd.).
Lecture Theatre, Manchester Literary and Philosophical MANCHESTER SECTION. Society, 36 George Street, Manchester 1. 7 p.m.

Thursday, 19th January 1961

MANCHESTER JUNIOR BRANCH. Fibre Identification. F. W. Lindley, Esq., Ph.D. and C. Beaumont, Esq., B.Sc., A.R.I.C., A.T.I., A.S.D.C. (Research Dept., Courtaulds Ltd.). Room J/E.11, Jackson Street Extension, College of Science and Technology, Manchester. 4.30 p.m.

Friday, 20th January 1961
West Riding Section. Annual Dinner and Dance. Victoria Hotel, Bradford.

Thursday, 28th January 1961
WEST RIDING SECTION. New Light on the Reactivity of Wool with Acids and Alkaline Solutions. R. L. Elliott, Esq., B.Sc., Ph.D. (London), F.R.I.C., F.T.I., F.S.D.C. and R. S. Asquith, Esq., M.A., Ph.D., F.S.D.C. (Bradford Institute of Technology). The Victoria Hotel, Bridge Street, Bradford. 7.30 p.m.

Friday, 27th January 1961
LONDON SECTION. Annual Dinner and Dance. Waldo
Hotel, Aldwych, London W.C.2. 7 p.m. for 7.30 p.m.

Monday, 30th January 1961

HUDDERSFIELD SECTION. Modern Piece Scouring Methods in Relation to Uneven Dyeing. B. F. J. Moxon, Esq. (Wool Industries Research Association). (Joint meeting with the Huddersfield Textile Society.) College of Technology, Huddersfield. 7.30 p.m.

Friday, 3rd February 1961
LONDON SECTION. Dyeing of Millinery and Allied Materials. Short papers by members of Barford Bros. Ltd., Luton. Royal Society, Burlington House, London W.1. 6 p.m.

Tuesday, 7th February 1961

NORTHERN IRELAND SECTION. Science in the Detection of Crime. Dr. A. J. Howard (Director of the Department of Industrial Forensic Science). Joint meeting with the Textile Institute. Chamber of Commerce Board Room, Donegall Square West, Belfast. 7.30 p.m.

Wednesday, 8th February 1961

MIDLANDS SECTION. Work Study in the Dyehouse. B. Lockwood, Esq., B.Sc., and R. W. Richardson, Esq., Ph.D., B.Sc., A.R.I.C. (Furzebrook Knitting Co. Ltd.).

Thursday, 9th February 1961
West of England and South Wales Section. Effluents— The Legal Position and Method of Treatment. J. H. Harwood, Esq., B.Sc., A.R.I.C. (Peter Spence & Sons Ltd.). County Hotel, Taunton. 6.30 p.m.

West Riding Section. The Problem of Illumination in Colour Matching. K. McLaren, Esq., B.Sc., F.R.I.C., F.S.D.C. (Imperial Chemical Industries Ltd.). The Hotel Metropole, King Street, Leeds. 7.30 p.m.

Tuesday, 14th February 1961
BRADFORD JUNIOR BRANCH. Modern Piece Scouring
Methods in Relation to Uneven Dyeing. B. F. J. Moxon, Esq. (Wool Industries Research Association). Institute of Technology, Bradford. 7.15 p.m.

NORTHERN IRELAND SECTION. The Principles of Colour Photography. D. P. Ayres, Esq., B.Sc., A.R.P.S. (Ilford Ltd.). Grosvenor Rooms, Belfast. 7.30 p.m.

Scottish Section. Mechanism of Crease-recovery. J. A. Wilson, Esq., B.Sc., Ph.D. (British Rayon Research Assoc.). (Joint meeting with the Textile Institute.) Room M 406, Royal College of Science and Technology (New Building) Glasgow. 7.30 p.m.

Thursday, 16th February 1961

MANCHESTER JUNIOR BRANCH. Three short papers by members of the Section. (Prize donated by Manchester Senior Section.) Room J/E.11, Jackson Street Extension, College of Science and Technology, Manchester. 4.30 p.m.

Friday, 17th February 1961

MANCHESTER SECTION. The Dye and the Fibre—Study of the Movement of Dye Molecules Within the Fibre. Dr. R. McGregor (Lecturer in Textile Chemistry, The University of Manchester). Lecture Theatre, Manchester Literary and Philosophical Society, 36 George Street, Manchester 1, 7 p.m.

continued on page v

FORTHCOMING MEETINGS OF THE SOCIETY - continued from page iv

Tuesday, 21st February 1961

HUDDERSFIELD SECTION. Some Aspects of the Chemistry of Afterchroming. L. Peters, Esq., Ph.D., M.Sc. (Leeds University). Silvios Cafe, Huddersfield. 7.30 p.m.

Thursday, 23rd February 1961

MEST RIDING SECTION. Recent Developments in Dyeing Acrylic Fibres. B. Kramrisch, Esq., F.R.I.C., F.T.I., F.S.D.C. (CIBA Clayton Ltd.). The Victoria Hotel, Bridge Street, Bradford. 7.30 p.m.

Friday, 24th February 1961

LONDON SECTION. Technical Aspects of Textile Marketing in Relation to the Dyeing and Finishing Industry. H. A. Thomas, Esq., Ph.D., F.R.I.C., F.T.I., F.S.D.C. (Marketing Division Director, Courtaulds Ltd.). George Hotel, Luton. 6.30 p.m.

Monday, 27th February 1961

HUDDERSFIELD SECTION. Application of Colour Theory to Fibres, Yarns and Fabrics. P. Warburton, Esq., M.C., F.S.A.M. (Former Head of Bury Municipal School of Arts and Crafts). Joint Meeting with the Halifax Textile Society. Alexandra Hall, Halifax. 7.30 p.m.

Tuesday, 28th February 1961

LEEDS JUNIOR BRANCH. The Applications and Uses of the Synthetic Vinyls in the Textile Industry. J. H. MacGregor, Esq., Ph.D., F.R.I.C. (Courtaulds Ltd., Bocking). The Lecture Theatre, Department of Colour Chemistry and Dyeing, The University, Leeds 2. 3.15 p.m.

Friday, 3rd March 1961

LONDON SECTION. Colour Measurement: its possibilities for the Colourist. H. W. Ellis, Esq., Ph.D., A.R.C.S., A.R.I.C., F.S.D.C. (CIBA Clayton Ltd.). Royal Society, Burlington House, London W.1. 6 p.m.

MIDLANDS SECTION. Annual Dinner. Nottingham Co-operative Society, Upper Parliament Street, Notting-ham. 7 p.m.

Tuesday, 7th March 1961

Leeds Junior Branch. The Principles of Colour Photography. D. P. Ayres, Esq., B.Sc., A.R.P.S. (Ilford Ltd.). The Lecture Theatre, Department of Colour Chemistry and Dyeing, The University, Leeds 2, 3.15 p.m.

ORTHERN IRELAND SECTION. The Finishing of 'Terylene' | Flax Fabrics. I. E. Haden, Esq., B.Sc., A.T.I. (Imperial Chemical Industries Ltd.). Grosvenor Rooms, Belfast. NORTHERN IRELAND SECTION. 7.30 p.m.

Thursday, 9th March 1961

MANCHESTER JUNIOR BRANCH. Annual General Meeting. The Standfast Molten Metal Dyeing Machine. Lecture and Film. A. Ogden, Esq. (Standfast Dyers and Printers Ltd.). Room J.E.11, Jackson Street Extension, College of Science and Technology, Manchester. 4.30 p.m.

MIDLANDS SECTION. Flameproofing. J. E. W. Perfect, Esq., B.Sc. (Proban Ltd.). (Joint meeting with the Coventry Textile Society). Courtaulds Acetate and Synthetic Fibres Laboratory, Lockhurst Lane, Coventry. 7 p.m.

WEST RIDING SECTION. Stimulus and Response—Reactions to Some Current Problems in Textile Finishing. G. W. Madaras, Esq., Ph.D., and S. N. Bradshaw, Esq. (Courtaulds Ltd., Coventry). The Victoria Hotel, Bridge Street, Bradford. 7.30 p.m.

Tuesday, 14th March 1961

NORTHERN IRELAND SECTION. General Principles in the Screen Printing of Fabrics made from Natural and Synthetic Fibres. P. Pyle, Esq., A.R.I.C. (Decorative Fabrics Ltd.). Grosvenor Rooms, Belfast. 7.30 p.m.

Scottish Section. (Title later). G. H. Lister, Esq., Ph.D. (Sandoz Ltd.). St. Enoch Hotel, Glasgow. 7.15 p.m.

Wednesday, 15th March 1961
Bradford Junior Branch. The Dyeing of Worsted Pieces.
H. S. Smith, Esq. (CIBA Clayton Ltd.). Institute of Technology, Bradford. 7.15 p.m.

MIDLANDS SECTION. Early Attempts to Dye Secondary Acetate. E. Stanley, Esq., M.Sc., and A. J. Wesson, Esq. (British Cclanese Ltd.). Celanese Sports Pavilion, Spondon. 7 p.m.

Friday, 17th March 1961

MANCHESTER SECTION. Textile Finishing Symposium. (Details to be announced later). Great Hall, College of Science and Technology, Manchester. 2 p.m.

Tuesday, 21st March 1961

HUDDERSFIELD SECTION. Fibre Identification— a lecture demonstration. F. W. Lindley, Esq., Ph.D. and C. Beaumont, Esq., B.Sc., A.R.I.C., A.T.I., A.S.D.C. (Courtaulds Ltd.). Silvios Cafe, Huddersfield. 7.30 p.m.

Thursday, 23rd March 1961

MIDLANDS SECTION. The Dyeing of Blends for Use in Carpets. R. C. Cheetham, Esq., A.M.C.T., F.R.I.C., F.S.D.C., (Courtaulds Ltd.). Carpet Trades Ltd., Canteen, Kidderminster. 7 p.m.

WEST OF ENGLAND AND SOUTH WALES SECTION. EST OF ENGLAND AND SOUTH WALES SECTION. Technical Service in the Dyestuffs Industry. F. North, Esq., B.Sc. (Imperial Chemical Industries Ltd.). The Pillar Room,

Mauretania, Bristol. 6.30 p.m.

West Riding Section. Annual General Meeting. Followed by Four Decades with Dicel. A. J. Wesson, Esq. (Furze-brook Knitting Co. Ltd.). The Victoria Hotel, Bridge Street, Bradford. 7.30 p.m.

Friday, 24th March 1961
LONDON SECTION. Annual General Meeting and Dinner.
Waldorf Hotel, Aldwych, London W.C.2. 6.30 p.m. for 7 p.m.

Tuesday, 28th March 1961

Tuesday, 28th March 1961

Scottish Section. Ladies Evening. Fashion and Mistress Brown, 1780-1880. R. A. Peel, Esq., F.S.D.C. (Subject will be women's clothes, the colours and dyes, the influence of events—French Revolution, Chartist Movement, Queen Victoria, Mauve and Magenta (i.e. "Coal-Tar" dyes), Church of Scotland, Episcopal Church, etc. — upon the dress of Scotswomen). St. Enoch Hotel, Glasgow. 7.15 p.m.

Tuesday, 11th April 1961

Scottish Section. Annual General Meeting. 7 p.m. Followed by An Instrumental Approach to Colour Matching. R. Sinclair, Esq., B.Sc., A.S.D.C. at 7.30 p.m. St. Enoch Hotel, Glasgow.

Thursday, 13th April 1961
MIDLANDS SECTION. Annual General Meeting. Calculations of Fading Rates of Dyes of Different Lightfastness on Exposure to Fluorescent Tubes. S. M. Jaeckel, Esq., B.Sc., A.R.C.S., A.R.I.C. and C. D. Ward, Esq., B.Sc. Effect of Dry Heat Treatment on the Dye Uptake of Nylon. S. M. Jaeckel, Esq., and D. A. Bampton, Esq., B.Sc. King's Head, Loughborough. 7 p.m.

Tuesday, 18th April 1961

HUDDERSFIELD SECTION. Annual General Meeting. The Identification of Dyes in Substance and on the Fibre. G. W. Midgelow, Esq., B.Sc. (Imperial Chemical Industries Ltd.). (Joint meeting with the Huddersfield Section of the Royal Institute of Chemistry.) Silvios Cafe, Huddersfield. 7.30 p.m.

Thursday, 20th April 1961

MANCHESTER SECTION. Annual General Meeting. Factors
Affecting the Efficiency of the Washing Process. G. J.
Parish, Esq., B.Sc., A.Inst.P. (British Cotton Industry
Research Association). Lecture Theatre, Manchester
Literary and Philosophical Society, 36 George Street,
Manchester 1. 7 p.m.

The Journal of the Society of Dyers and Colourists

(Subscription rates for non-members £5 5s 0d per annum, post free)
(Abstracts section only printed on one side of paper—£2 0s 0d per annum)

NOTICE TO MEMBERS AND SUBSCRIBERS

Readers requiring general information regarding the Official Notices, List of Officers of the Society, etc, should consult pages 1-10 of the January 1960 and pages 389-396 of the July 1960 issues of the Journal, or write to The General Secretary, The Society of Dyers and Colourists, Dean House, 19 Piccadilly, Bradford 1, Yorkshire (Telephone Bradford 25138). Editorial Communications should be addressed to The Editor, at the same address.

Forthcoming Papers

The following papers have been accepted by the Publications Committee, and will appear in future issues of the Journal—

LECTURE

The Dyeing and Finishing of Fabrics containing Tricel Triacetate Fibre

R. J. Mann

COMMUNICATION

An Autoradiographic Method based on Tritium for Locating Resin Finish in Textiles

G. S. Park

MEMBERS' CHANGES OF ADDRESS

CORRECTION

Mr. E. G. Heighway-Bury has not changed his private address which is still 10 Fir Avenue, Bramhall, Cheshire. The change announced in the August Journal refers only to his business address.

- Ackroyd, D., formerly of 33 Mandale Road, Horton Bank Top, Bradford, to 23 Salcombe Drive, Redhill Lodge, Arnold, Nortingham
- Argent, J. P., formerly of 36 Blundell Road, Luton, Bedfordshire, to 2 Wellstead Gardens, Westcliff-on-Sea, Essex
- Beaumont, R., formerly of Rievaulx, 52 Longmeadow Drive, Dinas Powis, Glamorganshire, to c/o Shafton View, Leeds 11, Yorkshire
- View, Leeds 11, Yorkshire

 Best, M. J., formerly c/o British Cotton & Wool Dyers'
 Association Ltd., Cumberland House, Lissadel
 Street, Pendleton, Salford 6, to 124 Whitchurch Road,
 Manchester 22
- Manchester 22 Biddulph, A. P., formerly of 9 Baston Street, Radford, Nottingham, to 26 Ortzen Street, Nottingham

- Blair, H. S., formerly of 54 Springhill Road, Bangor, Co. Down, N. Ireland, to 49 Ballyholme Road, Bangor, Co. Down, N. Ireland
- Blue, W. A., formerly of 26 Bank Street, Paisley, Scotland, to Belmont, The Crescent, Dunblane, Perthshire
- Davies, H., formerly c/o Messrs. Jacobson Van Den Berg (S.A.) (Pty) Ltd., P.O. Box 3577, Johannesburg, S. Africa, to Messrs. Jacobson Van Den Berg (S.A.) (Pty) Ltd., P.O. Box 1875, Durban, S. Africa
- Draper, D. M., formerly of James A. Beck & Son Ltd., Belfast Chemical Works, Dalton Street, Belfast, to 163 Lloyd Street South, Fallowfield, Manchester 14
- Elliot, A., formerly of 36 Longcroft Crescent, Hawick, Roxburghshire, to Wolsey Ltd., Abbey Meadow Mills, Abbey Meadow, Leicester
- Erenler, I., formerly of Nisantas, Mau Mansurll, Istanbul, Turkey, to Haci Mansur Sokak 22, Nisantas, Istanbul, Turkey
- Erga, R., formerly of 193 Yonge Street, Kingston, Ontario, Canada, to 911 Jackson Drive, James Terrace, Williamsburg, Virginia, U.S.A.

continued on page xxxiii

Patents Designs Trade Marks

W P THOMPSON & CO

50 LINCOLN'S INN FIELDS LONDON WC 2 Holborn 2174 12 CHURCH STREET LIVERPOOL 1 Royal 3172

Foron[®]

ultra-dispersed

A new range of disperse dyestuffs, specially suitable for dyeing and printing polyester fibres and blended fabrics containing polyester fibre

- · High affinity for polyester fibres
- Applicable by the normal carrier and high-temperature dyeing methods
- Outstanding fastness to light, wet treatments and wear

The range now available is

FORON BRILLIANT YELLOW 6 GFL*
FORON YELLOW 2 GL*
FORON YELLOW RGFL
FORON BRILLIANT ORANGE GL
FORON ORANGE GFL
FORON ORANGE RFL
FORON BRILLIANT VIOLET BL
FORON BLUE 3 RFL*
FORON BLUE GFL*

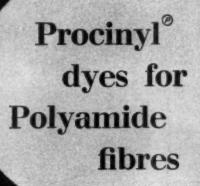


SANDOZ PRODUCTS LTD

Calverley Lane Horsforth Leeds

* Protected by patent rights in many industrial countries





PROCINYL YELLOW G

PROCINYL ORANGE G

PROCINYL SCARLET G

PROCINYL BLUE R

and now . . .

PROCINYL RUBINE B

the latest addition to the range

Patents applied for in the main industrial countries

EXCELLENT WET-FASTNESS GOOD LIGHT-FASTNESS

EASY APPLICATION

The world's first reactive

an I.C.I. discovery
BRIGHT SHADES

disperse dyes -



Full information on request.

IMPERIAL CHEMICAL INDUSTRIES LIMITED LONDON SWI ENGLAND

X162

THE JOURNAL

OF THE

Society of Dyers and Colourists

Volume 76 Number 10

OCTOBER 1960

Issued Monthly

Proceedings of the Society

The Use of Colour in Cosmetics

D. F. ANSTEAD

Meeting of the London Section held in the rooms of the Royal Society, Burlington House, London, on 6th November 1959, Dr. T. H. Morton in the chair

A brief historical introduction to the use of colour in cosmetics is followed by a classification of the colouring matters employed. The desirable properties of colorants for use in individual cosmetic products are described, with a summary of the present position of cosmetic colour legislation in the United Kingdom, the United States and Canada.

HISTORICAL INTRODUCTION

The use of cosmetics can be traced back to the earliest days of civilisation, and it is almost certain that the first cosmetics were little more than colouring matter. Green ore of copper used as an eye-shadow has been found in burial grounds dating back to 5000 B.C., whilst a mummy of the 18th dynasty around 1600 B.C. is reported as having red-dyed hair. The Old Testament has frequent references to women who "painted their face", whilst the use of kohl in Eastern countries for darkening the eyelid and increasing the lustre of the eye is well known. Kohl is accepted as being finely powdered antimony sulphide, a substance not exactly desirable for intimate contact with the skin, and especially in the area of the eye; it may also be prepared from the soot collected from burnt almond shells or frankincense. Egypt, the art of cosmetics reached its zenith in the time of Cleopatra, who, apart from her well-known baths in asses' milk for the improvement and whitening of her skin, is alleged to have extended the use of henna to the dyeing of the finger nails, the palms of the hands and the soles of the feet. The Romans developed an interest in cosmetics at a later date, and it is stated that, at the time of Nero, in addition to the use of kohl and henna, white lead and chalk were commonly used for whitening the skin, and bleaching of the hair was prevalent.

The use of cosmetics in England seems to have originated with the Crusades, when the Knights returned with prizes from the harems of the East. By the time of Elizabeth I, toilet preparations played a definite part in social life, being kept in strongly perfumed boxes known as "Sweet Coffers", which were considered a necessary item of bedroom furniture. Mary, Queen of Scots, is stated to have bathed in wine— and on that score to have applied

for an increased financial allowance—while less august members of Court had to be content with milk. The Civil War brought an abrupt end to progress in this field, but there was a complete change in attitude at the Restoration, when ladies of the Court sought every available means for improving their physical appearance. The widespread use of cosmetics during the following century is well illustrated by quoting an Act of Parliament introduced in 1770, which stated that "all women that shall betray into matrimony any of His Majesty's subjects by the scents, paints, cosmetic washes, high-heeled shoes, etc., shall incur the penalty of the law in force against witchcraft and that the marriage, on conviction, shall stand null and void." As far as is known this Act is still on the statute book.

The use of cosmetics in France followed a parallel course: it was encouraged in the time of Louis XIII— Anne of Austria was well known for her use of almond paste for whitening the skin—and frowned upon by Louis XIV. The rise of Napoleon coincided with a revival of interest in cosmetics, which were used by Josephine as a result of her upbringing in Martinique, and it is probable that the modern cosmetic industry can be traced back to the first decades of the nineteenth century in France, where an early lead was established.

In the early days of the United States, the growth in the use of cosmetics followed the same pattern as in Europe, with local variations from State to State. As the size and wealth of the population increased, the quantity of cosmetics manufactured expanded enormously, and today the American cosmetic industry is comparable in size and output with that of the rest of the world. This rapid growth has been favoured by the extremes of temperature in the United States, which call for

more care of the complexion than is required by the temperate British climate. The American fondness for anything new has also assisted the development of fresh products, and it is generally accepted that, in development and progress, the industry is about five years ahead of its counterpart in Europe. This is particularly apparent in cosmetic preparations for men.

The value of current production of cosmetics in the United Kingdom is estimated to be of the order of £56 million per annum. In the United States one firm has domestic sales of £42 million and another has sales of at least £37 million per annum, whilst there are at least ten companies with sales considerably in excess of £10 million per annum. From these figures, it is clear that the industry is an important factor in the economy of countries where the use of cosmetics has an accepted social function.

COLOURING MATTERS USED IN COSMETICS

Colouring matters which are accepted as suitable for use in cosmetics can be divided into two classes, according to whether they are soluble or insoluble, and this vital difference affects the production and properties of the finished article.

Soluble Colouring Matters

These, in turn, are divided into two classes, viz. water-soluble and oil-soluble, and nearly all of them are synthetic organic dyes. Occasionally natural colouring matters, e.g. annatto and β -carotene, are employed because of their special properties, whilst carmine (the aluminium lake of cochineal) is also used to some extent in its soluble form for special purposes.

Insoluble Colouring Matters

These may be divided into organic and inorganic materials, with a further subdivision as follows—

(1) ORGANIC

- (a) Lakes of soluble dyes
- (b) Pigments

(2) INORGANIC

- (a) Earths, oxides, Ultramarines, Carbon Blacks, etc.
- (b) Gold, silver, aluminium and bronze powders; pearl essences, etc. (almost always used for special effects)

Most of the lakes employed in cosmetics are prepared from acid dyes, although a few basic dyes, as well as alizarin, are used. The pigments, almost all of which belong to the azo class, are used either as prepared or after lake formation with a heavymetal salt. All types of naturally occurring earths and oxides are suitable for use in cosmetics, but it is often very difficult to obtain products of sufficient purity. The presence of arsenic and, to a lesser extent, lead causes most difficulties, and all batches must be checked before use. Much less difficulty is experienced with Ultramarines and Carbon Blacks, owing to their methods of manufacture. The remaining colorants, i.e. gold, silver, aluminium, bronze, etc., are all employed in small quantities for special purposes, as discussed later.

COSMETIC COLOUR LEGISLATION

Only two countries, viz. Canada and the United States, have included in their legislation specific and detailed regulations governing the use of colouring matter in cosmetics.

The United States

Legislation in the United States originated in the Federal Food and Drug Act of 1906, when it was laid down that only permitted colorants could be used in food, and seven coal-tar dyes were specified for this purpose. After ten years, one more colorant was added. Even after thirty years from the commencement of control, only eight more dyes had been added to the original list, which still applied only to foodstuffs. In 1938 the Food, Drug and Cosmetic Act was passed: it is the basis of present-day legislation and governs the use not only of colorants, but of any chemical product which may be consumed or applied to the human body.

The Food, Drug and Cosmetic Act of 1938 specifies 116 permitted dyes or, as they are usually called, "certified colours", and divides them into three classes, viz.—

- (1) FD&C Colorants permitted for use in food, drugs and cosmetics
- (2) D&C Colorants permitted for use in drugs and cosmetics
- (3) External D&C Colorants permitted for use in externally applied drugs and cosmetics, the lips and any body surface covered by mucous membrane being specifically excluded.

Each colorant is described in accepted scientific terms, and a specification for purity is laid down as follows—

- (i) For each class, i.e. FD&C, D&C or Ext. D&C, there is a maximum limit for lead, arsenic and heavy-metal content
- (ii) In the case of barium, certain salts of which are permitted in the D&C and Ext. D&C sections, a limit is laid down for soluble barium (in dilute HCl) as barium chloride
- (iii) A detailed specification is given for each individual permitted colorant which lists upper or lower limits for pure dye content, water-soluble or insoluble matter, free intermediate content, etc.

The colorant must also be free from all impurities to the extent that these can be avoided by good manufacturing practice (this can lead to arguments with the Food and Drug Administration).

The Food, Drug and Cosmetic Act as outlined so far applies only to coal-tar dyes and pigments. Lakes are included as derivatives of permitted colorants, but the Act lays down the type of substrate which is permitted and the nature of the precipitant. A general specification governing the permitted lakes is given for each class (for cosmetic colorants the specification is the same and covers

ether extracts, soluble salts, and intermediates). A standard nomenclature is also specified, whereby the name of a lake is made up from the listed name of the dye from which it is derived and from the name of the substrate, together with the word "Lake".

The Act also introduced the process of certification, whereby the manufacturer has to forward for analysis a large sample of the dye, taken from bulk, to the Food and Drug Administration in Washington. If the sample is approved, the corresponding batch is given a lot number, and every sale from this batch must quote the lot number, the manufacturer's batch number and the percentage purity of the dye.

It will be evident from the above summary that the use of colorants in cosmetics is strictly controlled in the United States. Although minor alterations in the 1938 Act have been made since its inception, it is only in the last year or so, in the light of new research work, that any genuine criticism has been made of the working principles which it embodies.

The present position of colorants under the Food, Drug and Cosmetic Act can be summarised as follows—

Hues	FD&C	D&C	Ext. D&C		
Hues	(soluble dyes only)	Dac	Ext. Dat		
Yellows	2	2	12		
Oranges	41-100	12	6 ,		
Browns	Servell)	1	arrest.		
Reds	4	24	23		
Violets	1	1	2		
Blues	2	6	5		
Greens	3	5	1		
Blacks		1	1		
Total	12	52	50		

The numbers quoted do not include lakes which can be prepared from the permitted dyes.

As mentioned previously, recent research has given rise to some criticism of the Act, and the following amendments issued by the Food and Drug Administration this year are noteworthy—

- (1) The introduction with specification of Citrus Red No. 2, to be used only for the colouring of the skins of oranges and to the extent of not more than 2 p.p.m. based on the weight of the whole fruit
- (2) The introduction of the use in foods of lakes of FD&C colorants prepared on an aluminium or calcium-aluminium substrate
- (3) The removal from the D&C section of 17 colorants previously permitted, of which 13 were declassified to the Ext. D&C section and 4 banned for use in foods, drugs or cosmetics.

This third amendment has caused a considerable stir in the cosmetic world, as several of these 17 colorants were pigments or dyes from which lakes were manufactured for use in considerable quantity in lipsticks. The original Food, Drug and Cosmetic Act embodied the idea that certain dyes were harmless to the human system at any level

of assimilation. Feeding trials with these 17 colorants showed that they were harmful, so the Administration had to declassify or ban them. The probable outcome of this action will be the introduction of an Act incorporating provisions for the use of limited amounts of certain dyes in particular products, and this is suggested by the action taken with Citrus Red No. 2. Whatever the final outcome, it is certain that the United States will see within the next year or so a change in cosmetic colour fashion not brought about by the cosmetic manufacturer.

Canada

Canada has a Food and Drugs Act which in many ways runs parallel to the United States' Food, Drug and Cosmetic Act. For foodstuffs, there is a list of permitted dyes with specifications, but no certification procedure with analysis of samples. For cosmetics, Canadian law calls for the use of colorants with specified limits for arsenic, lead and heavy metals, but there is no list of permitted dyes, the authorities, as yet, being content with the provision that adequate samples of any colorant used in cosmetics shall be furnished to them on request. As many United States manufacturers have associated plants in Canada, the colorants employed there are based essentially on United States requirements.

The United Kingdom

In the United Kingdom, there is as yet no list of permitted or approved colorants for cosmetics, and, beyond the very general provisions of the Food and Drugs Act, the cosmetic manufacturer may use any dye at his discretion, i.e. statutory control of cosmetic colorants has so far been related to that for food dyes. As specific legislation for food dyes was introduced for the first time in 1957, it seems probable that some control may soon be forth-The Toilet Preparations Federation, generally accepted as representing the majority of manufacturers in this country, has issued specifications for many cosmetic raw materials in recent years, and no doubt colorants will eventually receive their consideration. It is to be hoped that experience gained in the production of the British list of permitted food dyes will be of guidance to those concerned, and that a list will be established which has at least a measure of international acceptance.

PROPERTIES REQUIRED BY COLORANTS IN COSMETICS

Soap and Bath Crystals

Since both products are permanently alkaline, any colorant employed must have excellent fastness to alkali. With soap, especially, there is also the possibility of dye migration in the mass, with consequent change in hue and the development of discoloured patches on storage. There are many suitable dyes which are fast to alkali, but they must always be rigorously checked for fastness against the perfume which is being employed. Most perfumes are a complex mixture of chemicals, and new materials are being added constantly to

the list of possible ingredients in a perfume formulation. Each of these perfumery raw materials has an effect on the dye used in a cosmetic preparation, and a very slight modification of the formula may have striking and disastrous results. The nature of the perfume is, without doubt, the factor which finally governs the choice of colorant in any cosmetic. The effect on dyes of the well-known types of perfume has been determined. Those containing a high proportion of aldehydes and reducing compounds are rapidly destructive, whilst perfumes with a considerable amount of resinoid base have little effect. As yet, however, there is no means of predicting the result with certainty, and rigorous shelf-tests provide the only means for ensuring satisfactory results.

With soap, solutions of dyes are introduced at the milling stage, and with bath crystals in the dry state during mixing. Lakes are rarely used, since they are readily split into the dye and the base, owing to the alkaline nature of the medium. Pigments are of considerable value, because of their high fastness in low concentrations, but they must be in a form capable of easy dispersion in the viscous mass. Azo pigments are rarely suitable, and it is often necessary to use the highly stable pigments of the vat class.

Face Powder

A face powder may be defined as a weak dispersion of colorant on a perfumed base of inorganic white pigments often containing a proportion of fats, oils and waxes, and designed to adhere to and tint the skin. The short life of the product in use eliminates the need for a colorant of high lightfastness, whilst tinctorial power is of little importance, owing to the low concentration required. Particle size is of interest to the cosmetic manufacturer, but it is not of vital importance, since it is often rendered ineffective by inadequate methods of dispersion of the colorant in the cosmetic base. The prime factor is not so much fineness of division as ease of dispersion. Most cosmetic manufacturers would agree that the best results in face powders are obtained by using reduced, rather than concentrated, colorants, on bases similar to those employed in the end-product. These are best prepared during manufacture of the pigment: they cannot be produced satisfactorily once the pigment has been manufactured, owing to the formation during drying of aggregates which are not broken down on milling. The use of these semi-prepared colorants reduces the development of colour on the face or puff, although this development may be brought about by other factors, the chief of which is colour bleeding. The principal cause of colour bleeding is the perfume, and any perfume which is to be used in a face powder should be checked for reaction with the pigments to be employed. The extent of bleeding in the presence of water and alcohol should also be most carefully checked, as the pigment will be subjected to the action of perspiration and the glandular excretion of the skin. Incorrect choice of pigment may result in a change of colour of the face powder after manufacture owing to bleeding caused by the

perfume and the added materials in the cosmetic base, or the change of colour may occur on the skin. The important requirements of a pigment for face powder are as follows, other factors being of minor importance—

(1) High resistance to bleeding in all solvents

(2) Good dispersion properties.

The most satisfactory colorants for face powders are naturally occurring earths and oxides selected for freedom from impurity. Their one disadvantage is dullness of hue, but by careful blending this defect can be largely overcome.

Organic pigments are required for brightening some shades of powder, and their selection requires very careful consideration—probably only one or

two are suitable for this purpose.

Foundation Lotions, Cake Make-up, and Similar Preparations

As far as the choice of pigment is concerned, all these face-colouring preparations present the same problems as those of a face powder, but with special emphasis on freedom from bleeding in water, fats and oils. The cosmetic manufacturer may again have difficulty in preventing development of the colour on the face during application, but this can be largely overcome by the use of semi-processed colorants, often in paste form, in one of the basic media of the finished product.

Hair Colorants

Cosmetic products for colouring hair can be divided into two classes, viz.—

- (1) Permanent hair-dyeing preparations
- (2) Rinse-type preparations designed to give temporary colouring only.

Almost all products in class (1) employ oxidation bases, although some lead salts developed with a sulphide or pyrogallol are used, as well as the vegetable dye, henna. These oxidation bases, which include diamines, aminophenols and their nitro-derivatives, require the use of peroxide in the formation of the final pigment. This is probably advantageous, as the shade produced may be lightened to meet the customer's requirements, but it entails the use of two solutions which must be used shortly after mixing. Care is required in use, owing to the possibility of dermatitis.

"Full-intensity rinses" usually contain acid dyes, selected basic dyes or dyes of other classes being introduced when required. The dyes are marketed in the form of a concentrated solution which may also contain anionic, cationic or nonionic surface-active agents, quaternary ammonium derivatives, swelling agents to disrupt the cystine linkage and provide further dyeing sites for acid dyes, solvents, dispersing agents, and many other products considered to be of value in the treatment of hair. Human hair is probably the most difficult material ever placed before the dyer. It may have been partially bleached at the ends; permanently waved in places; or treated with a cationic conditioning cream and washed weekly with an anionic shampoo—all these chemical treatments affect the hair and none of them uniformly. In

addition, most of the full-intensity rinses are used in the home and applied in a manner which is far from ideal. Perhaps the hairdresser and the manufacturer of colour rinses deserve more sympathy than they receive!

Lipstick Colorants

A lipstick may be defined as a highly-concentrated dispersion of pigment in fats, oils or waxes designed to be applied to the lip surface in a thin film. The short life of the product eliminates the need for colorants of high fastness to light, although there may be exposure in the shop window.

A fine and even particle size (which can be controlled to a large extent by the dye manufacturer) is of value to the cosmetic manufacturer, but this must be balanced against the problems arising from occlusion of air in dry grinding. Efficient wet milling will largely overcome difficulties caused by pigmentary aggregates, and air occluded in the lipstick mass can be removed in several ways. The oil-absorption of the colorant is an important factor, as it controls the rheological behaviour of the finished mass during the final heating and moulding. High oil-absorptions are often associated with thixotropic behaviour.

If lakes are employed, it is important to select a substrate which will not react under any conditions of pH with the oils and fats in the lipstick mixture, thus giving rise to soaps and similar compounds and so causing gelling and difficulty in moulding. Freedom from soluble salts is also important, and it is often wise to use a substrate such as aluminium benzoate, which can be strictly controlled in manufacture, rather than alumina hydrate.

The moisture content of the colorant can give rise to difficulties in processing and should be kept to a minimum. The tinctorial power of the colorant is of great importance. A lipstick must impart a thin, highly-coloured film to the lips, so high inctorial power is an important requirement of a good lipstick pigment. Opacity, to ensure good hiding power, is necessary, so lakes should exhibit opaqueness in the oil, rather than transparency.

Bleeding of colour is a serious fault. Insufficient fastness to water causes smearing on the lip and gradual migration of the colorant away from the mucous membrane of the lip to other surfaces, as well as staining of the tongue and inner surfaces of the mouth. Low resistance to oil causes a gradual change of shade in the mass and divergence from the accepted standard, whilst with a slightly unbalanced formulation, droplets of highly-coloured oil, which are most unsightly, will develop on the stick.

It is also desirable that the lipstick should stain the mucous membrane. Adequate staining is usually obtained by introducing one of the Eosin family of dyes, which, in the great majority of lipsticks, is used in the water-insoluble acid form. (In this "acid" form, it possesses certain pigmentary properties which modify the final mass-tone of the stick.) The Eosin dyes have the special property of staining the lip membrane, and hence give permanence to the lipstick colour. They

have the disadvantage that a small percentage of lipstick users are allergic to them, but, with careful control during manufacture, the incidence of complaints can be reduced to a very small figure. For this irreducible minimum several manufacturers provide lipsticks which contain other staining agents.

The requirements of a pigment for lipsticks may be summarised as follows—

- (1) Reasonably good light-fastness
- (2) Small particle size
- (3) Stability to heat and pH
- (4) Low moisture content
- (5) Freedom from bleeding
- (6) High tinctorial power
- (7) Minimum tendency to cause an allergic reaction.

Many of these factors are controlled by the lipstick base employed— to such an extent that the type of pigment to be used requires very careful choice. In general, a dye of the Eosin type is used to give stain and permanence to the colour, together with a pigment, and a lake of selected strength and suitable characteristics.

Nail Polishes

These preparations may be described as fine dispersions of colorant in a base containing nitrocellulose, synthetic resins, plasticisers and solvents. The original nail polishes were clear and called for dyes in various shades of red which were soluble in the solvents used. About twenty years ago the now familiar cream-type lacquer was introduced. This type contains coloured pigment and titanium dioxide.

The primary requirement of a colorant for nail polishes is freedom from bleeding. The powerful action of the solvents employed renders lakes unsuitable, and pigments require very careful selection. Light-fastness is not of great importance, but the pigment should have good dispersion properties and should not migrate in the liquid polish or in the lacquer film. An associated problem with nail polishes arises from uneven settling out of the coloured and white pigments on standing, resulting in a white deposit at the base of the container. This difficulty can be overcome by manufacturing the coloured pigment in presence of titanium dioxide, which will then settle out as a coloured layer and is easily brought back into suspension. Milling of the two pigments in the polish base does not produce the desired result.

In recent years polishes have been developed which have a pearl or glitter finish. They are usually prepared by adding "pearl essence", a natural product which is made from the scales of fish and is available in the form of a paste containing nitrocellulose. The very recent introduction of a gold fleck in clear lacquer represents a striking advance in technology as well as fashion. Considerable work is also being carried out with the aim of producing permanent suspension of the pigments in the medium, and it appears possible that a solution to this old problem may have been found.

Eye Make-up

The United States' Food, Drug and Cosmetic Act states that coal-tar dyes are specifically excluded from eye make-up, so only oxides and other inorganic pigments can be used. With eye-shadow, considerable variation is obtained by adding silver or aluminium powder to the coloured material, thus giving sparkling effects and metallic sheen. The use of gold powder has also been reported. Bronze powder has been employed, but its use is inadvisable, owing to its copper content. With mascara the same colorants give excellent results in the properly formulated article.

Miscellaneous Liquid Preparations

Cosmetic products such as sun-tan lotions, perfumes, toilet waters, bath essences, wave-setting (MS. received 14th December 1959)

lotions, deodorants, anti-perspirants, etc., are coloured by means of a dye which is soluble in one of the liquid phases of the material. The light fastness of the colorant is affected by a variety of factors, the most important being pH and perfume, and without knowledge of the constituents it is not possible to guarantee the suitability of any particular dye. Difficulties also arise from the presence of thioglycollates, cationic surface-active agents, and certain aluminium salts, and when the range of available colorants is restricted by legislation, the final choice may not be an ideal one.

D. F. ANSTEAD LTD. VICTORIA ROAD ROMFORD ESSEX

COMMUNICATIONS

Some Physical Properties of Chemically Finished Viscose Rayon Filament Yarns and Fabrics

D. H. MORTON and C. BEAUMONT

The physical properties of viscose rayon filament yarns have been studied before and after treatment with a wide range of resin and formaldehyde finishes applied by normal, as well as unconventional, methods. A general relationship has been observed between the tensile elastic recovery, extensibility, wet initial modulus and water imbibition of chemically finished rayon yarns. The changes in tensile and other properties are described, and discussed with regard to their influence on resultant fabric properties. The finisher must compromise between improvement in some properties and impairment of others. This balance of yarn properties is unaffected by the type of treatment used, although widely different amounts of the various resins have to be used for similar effects. The choice of finish is governed by factors other than the effect on yarn tensile properties. Examples of such factors are liability to form inter-fibre resin deposits, frictional characteristics, fastness of the finish to various agencies, and fabric aesthetics.

INTRODUCTION

The chemical modification of cellulosic fabrics has received considerable attention in recent years, since by suitable treatment the dual benefits of increased crease recovery and reduced water imbibition, giving quick drying and dimensional stability, can be imparted. Most processes depend for their success on the deposition of resinous condensates within the fibre itself 1, although some depend upon the interaction of cellulose and formaldehyde 2, under appropriate conditions.

The mechanism responsible for the effect is still debatable. It appears probable that the resin forms a three-dimensional network, being deposited presumably within the amorphous phase of the fibre. Cameron and Morton³ state that true covalent cross-linkages between adjacent cellulose molecules are formed, but Marsh considers that molecular entanglement alone is sufficient to explain all the known phenomena 4. Although the evidence for the former view is purely inferential 5, it is this one which is most widely held, and there is nothing in the present work to indicate that it is incorrect. Additional evidence 6. from infrared spectra, shows that ether linkages are present, lending further support to the covalent linkage theory.

Because of the commercial importance of the crease-resist process in relation to both viscose rayon and cotton fabrics, there is much published literature on the topic. Since, however, the properties of a fabric must depend largely on the properties of the constituent fibres, it is somewhat surprising to find that only limited studies have been made of the effects of these treatments on fibre properties.

A survey of the whole of the literature on crease recovery is beyond the scope of this introduction, and there are several general summaries to which reference can be made, such as those of Buck and McCord 7, and Nuessle 8. There is no great measure of agreement as to which of the fibre properties is most important in determining the crease-recovery properties of the final fabric. Some workers have found correlations between work of recovery of the fibres and crease recovery in a variety of fabrics, but there seems little doubt that, for a series of fabrics of similar construction, the best correlation is with the tensile elastic recovery* of the fibre.

Probably the most complete previous study of properties of resin-treated fibres is that of Gagliardi and Gruntfest 10. They found good correlation between fabric crease recovery and tensile elastic recovery for any one type of treatment. Some types of treatment gave fibres of increased initial modulus, and the authors concluded that this accounted for differences in fabric crease recovery when the constituent fibres had

• The definition of tensile elastic recovery is given on p. 580

similar tensile elastic recoveries. A correlation was also found, as might be expected, between the reduction in fibre extensibility and reduced fabric tear strength and abrasion resistance. Unfortunately, these workers made no measurements of wet fibre properties or of water imbibitions.

In the present work, aimed at improving the easy-care properties of viscose rayon fabries, it was taken as axiomatic that, for maximum crease recovery, the initial modulus and tensile elastic recovery of the fibres should be as high as possible in both the wet and the dry state. It was expected that changes in other properties of the fibre, e.g. extensibility, would set limits to the useful improvements possible with any given finish. Further, in order to obtain dimensional stability of the fabric, the water imbibition of the rayon should be reduced to a low value.

Different treatments were therefore applied to yarn samples with a view to sorting out the best of these for application to corresponding fabrics, at which stage further modifications such as addition of softener might be made for alteration of handle and drape. This programme had to be adjusted in order to take account of the results obtained during the investigation.

EXPERIMENTAL

Textile Materials

Bright continuous-filament viscose rayon yarn [150 den. (16·7 tex), 27 filament] was used for the treatments applied to yarn. For the treatments applied to fabric, a fabric composed of this yarn in a 2×2 twill weave was used. The fabric, which was given a commercial seour, contained 100 ends and 75 picks per in. in the scoured state.

Treatments

Treatments using different resins and methods of application were tried. The principal resins used, with an indication of the variables, are as follows—

 $\begin{array}{c} {\rm Urea-Formal Dehyde-Three\ types\ were\ used} \\ {\rm for\ various\ experiments,\ viz.--} \end{array}$

- (a) A laboratory-prepared resin, formaldehyde: urea ratio 1.7:1
- (b) A commercial resin syrup (BT313 resin, B.I.P. Chemicals Ltd.)
- (c) A commercial resin syrup sold for modification of handle, reputed to be condensed urea-formaldehyde (BT6 resin, B.I.P. Chemicals Ltd.).

Variables included different percentages of resin, different curing temperatures, the effect of washing-off, addition of softeners or methanol to the padding liquor, pre-condensation of the laboratory-prepared resin to a greater extent than normal, drying at room temperature under vacuum instead of by heat, and application without drying (i.e. by leaving the padded fabric to stand for several days to allow condensation to take place).

MELAMINE-FORMALDEHYDE— Different percentages of a commercial stabilised melamine-formaldehyde syrup (BT309 resin, B.I.P. Chemicals Ltd.) were used.

DIMETHYLOLETHYLENEUREA— Different percentages of a commercial D.M.E.U. resin syrup were used (BT324 resin, B.I.P. Chemicals Ltd.).

ACID FORMALDEHYDE— Different concentrations of formaldehyde, and various catalysts, were employed.

Cyanamide-Formaldehyde— Resin formulations using different catalysts were used.

Methods of Treatment

Usually the fabric samples were treated by immersing them in a solution of the appropriate resin and catalyst, removing the excess liquor on a laboratory pad mangle set to give an uptake of ca. 80%, putting the fabric on a pin-stenter frame at 3–5% above the fully relaxed dimensions, and drying in an oven at 75°c. with good air circulation. Baking was generally carried out at 135°c. for 6 min. Not all samples were washed off, but where this was done a treatment in a solution containing 2·5 g. soap and 2·5 g. soda ash per litre at 50°c. for 5 min., followed by rinsing, was employed.

Hanks of yarn were treated in a similar manner, except that the excess liquor was removed by centrifuging, again so as to give ca. 80% uptake.

Physical Testing Procedure

For experimental convenience, measurements were usually made on 150/27 (16·7 tex) yarn, rather than on single filaments. With these low-twist filament yarns the twist has negligible effect on yarn properties. Results on yarns are much more consistent than those on single filaments, particularly after resin treatment. This is especially noticeable when the breaking extensions of fibres are compared.

Results are affected by conditions of drying, but under normal conditions fibres differing in extensibility by a factor of two can be found in any individual sample. This is true both when fibres from a single yarn section are compared and when a long length of filament is extracted from a yarn and tested at points along its length. The variability is thought to be due to uneven distribution of resin, which is produced by migration of the pre-condensate during the drying stage. It is unfortunate that this is likely to lead to highest resin concentrations on the fibres on the outside of the yarns and fabrics, where they are subject to maximum stress during abrasion or fabric creasing.

Before being tested, all yarns were conditioned for at least 24 hr., approaching equilibrium from the damp side. Yarns taken from fabrics were relaxed in water to release dried-in strains, but this was not necessary for yarns treated in hank form.

All tensile tests were made on the Instron machine. A rate of extension or contraction of 100% per min. was used throughout, on a 5-cm. gauge length. Initial moduli, breaking loads and extensions were taken from at least ten load-extension curves for each sample in order to obtain the mean. Initial modulus was taken as the slope of the load-extension curve near the origin.

The procedure for determining tensile elastic recovery was as follows. Yarns were mounted in the jaws, just slack, and extended to a nominal

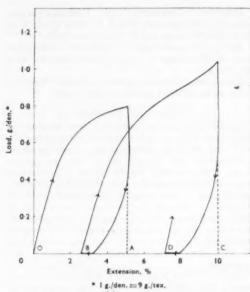


Fig. 1 — Loading and Unloading Cycles for Tensile Elastic Recovery Measurements on Yarn

5%, which was held for 30 sec. for stress relaxation to occur. The jaws were then returned to their original position, and after 30 sec., allowed for recovery, another cycle was started (Fig. 1). The tensile elastic recovery was taken as the fraction of the extension recovered after the final 30 sec., expressed as a percentage, i.e. tensile elastic recovery from 5% extension—

$$E_{\rm 5} = \frac{\rm AB}{\rm OA} \times 100\%$$

Where the yarns were sufficiently extensible, a cycle of up to 10% extension was run after the 5% cycle, when similarly—

$$E_{10} = \frac{\mathrm{CD}}{\mathrm{OC}} \times 100\%$$

This procedure is inevitably somewhat arbitrary, but it appears to be satisfactory for purposes of comparison.

Since a certain amount of slack in the yarn is inevitable, particularly with crimped yarns extracted from the fabrics, the actual level of extension applied is normally slightly below the nominal figure, say 4.8% instead of 5%. However, there are smooth curves relating tensile elastic recovery to extension. These were used to interpolate to the nominal extensions, to within the limits of accuracy of the measurements.

Measurements on air-dry samples were made in a room conditioned to $65\pm2\%$ R.H. and 68 ± 4 °F. Wet measurements were made in distilled water at 20°C., the samples being soaked for at least 1 hr. before being tested in order to avoid the effect of delayed wetting out. This occurs when samples treated with large amounts of resin are tested soon after immersion (Fig. 2). The shape of the load–extension curve depends upon the duration of immersion. The reason for this is not fully understood, but it is believed that the fibre is not fully wetted in times of 5 min. or less,

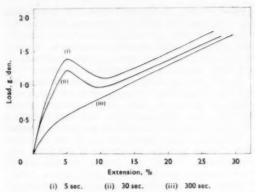


Fig. 2—Wet Load-Extension Curves for Viscose Rayon containing 15% Urea-Formaldehyde at Different Times of Immersion

so that the initial part of the load-extension curve corresponds to that of the dry fibre. Application of strain allows the fibre to be wetted, possibly by rupturing an easily broken network of resin, whereupon the stress decays to the value appropriate to the fully wetted fibre. This view is supported by the fact that, if the fibre is extended past the apparent "yield point" and allowed to recover, the subsequent extension produces a normal curve with no pronounced yield point (Fig. 3).

This point has been emphasised, since the wet initial modulus is a parameter of considerable importance in determining the wet processing and laundering performance of a fibre ¹¹, and it is possible, owing to this effect, to obtain values of the modulus which are several times greater than the true ones.

Chemical Testing Procedure

Estimations of resin content for the later part of this work have been carried out by extraction in 0-02 n. hydrochloric acid at the boil for 30 min., a procedure now thought to be satisfactory for most types of resin. Some of the earlier estimations on urea-formaldehyde-treated samples were made by extraction with acetic acid-sodium acetate buffer, but it is not considered that any appreciable error will have been introduced because of this.

Water imbibitions were measured by soaking samples in distilled water for 1 hr., followed by

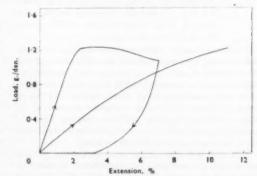


Fig. 3— Rapid Wet Load-Recovery Cycle for Viscose Rayon treated with 15% Urea-Formaldehyde Resin, Dried, and Baked

centrifuging for 5 min. at 1000 g to remove excess water, weighing, drying overnight at 105°c. and re-weighing.

RESULTS

The full results of yarn properties obtained are too numerous to be given in tabular form, but those referring to properties of particular significance are illustrated in Fig. 4–10, referred to below. All the different treatments had substantially the same effect on the various yarn properties, which are next considered individually (A) dry and (B) wet.

Tenacity

(A) In the dry state tenacity may be either increased or decreased, but the changes are small, generally less than 0·1 g./den.* in a tenacity of about 2 g./den. The more severe the treatment the more likelihood there is of degradation and decrease in tenacity. This is particularly so when high baking temperatures are used, e.g. 150°c. for 5 min. reduces tenacity to 1·2 g./den.

(B) In the wet state there is generally an increase in tenacity with increasing degree of treatment. This may be as much as 0.3 g./den. on a tenacity

of 1.0 g./den.

Extensibility

(A and B) In both the wet and the dry state extensibility of the yarn at break is reduced progressively by increasingly severe treatments (i.e. more resin, higher baking temperatures, etc.).

Initial Modulus

(A) In the dry state the modulus depends markedly on the conditions of drying. With increasing resin content, any dried-in strain causes a considerable increase in the modulus, of up to about 50% at the highest resin contents.

(B) In the wet state there is a marked increase in modulus, particularly at high resin contents.

Tensile Elastic Recovery

(A) There is an approximately linear increase in dry tensile elastic recovery with increasing resin

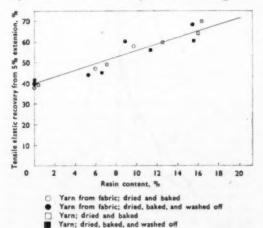


Fig. 4— Effect of Urea-Formaldehyde Content on Tensile Elastic Recovery of Yarn

content (Fig. 4), independently of whether the treatment is carried out on fabric or on hanks of yarn.

(B) The wet tensile elastic recovery properties of viscose rayon are practically unaffected by resin treatment.

Imbibition

As is well known, imbibition is markedly reduced by resin and several other treatments. Increasing severity of treatment gives greater reduction of imbibition.

DISCUSSION

Among the effects of treating viscose rayon yarn with resin, formaldehyde, etc., the following seem to be of importance with regard to ultimate fabric properties.

 A reduction in water imbibition, and hence of fibre swelling. This contributes to improvement

in dimensional stability of the fabric.

(2) An increase in dry tensile elastic recovery. This has already been shown to correlate with improvement in dry fabric crease recovery ¹⁰, although it is not the only factor influencing this

property.
(3) "Setting" crimp and relaxing strains in the yarns when the resin treatment is carried out on the fabric in the piece ¹². The importance of this effect in relation to crease recovery is not yet clear, but it can be shown to be of importance, e.g. in the heat-setting of nylon fabrics, where crease recovery may be improved without alteration of yarn

properties 12.

(4) An increase in the wet initial modulus of the fibre. In the untreated state the wet modulus of viscose rayon is only about 2–5% of the modulus in the air-dry state. The tensile elastic recovery of the wet fibre, when free from constraint, is high (ca. 80%) and is not much affected by resin treatment. The modulus, however, is low, so that not only do creases form easily in the wet fabric, but the actual forces of recovery may be too low to overcome inter-yarn friction and other constraints in the fabric which oppose completion of recovery. An increase in wet modulus must improve both resistance to formation of creases and the forces of recovery. Resin treatment achieves this without reduction in the tensile elastic recovery available.

(5) A sharp reduction in yarn breaking extension, which is the factor limiting the quantity of resin which can be applied. Low extensibility, and hence low work of rupture, leads to fabrics of low tear- and seam-strength, low resistance to abrasion and poor sewability. Marginal improvements can be made by using softeners and lubricating agents, as discussed below. The situation is made much worse by any sticking together of filaments by resin owing to faulty or excessive application. This cannot happen with acid formaldehyde treatments, for example, and these yield fabrics of relatively fair tear strength at a given level of yarn extensibility.

It is thus clear that a major part of the art of resin finishing on fabrics made from normal viscose rayon yarns is that of striking a compromise for any particular fabric construction between the

^{• 1} g./den. m9 g./tex.

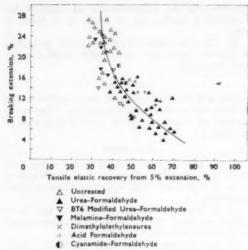


Fig. 5—Relation between Yarn Breaking Extension and Tensile Elastic Recovery

amount of improvement needed in the properties of tensile elastic recovery, imbibition and wet modulus, and the amount of reduction in extensibility which can be tolerated without degrading the wear properties of the fabric too far. It is therefore important to know if this balance can be modified by alteration in the nature of the finishing treatment.

Fig. 5 shows how the properties of extensibility and dry tensile elastic recovery are related for all the different types of treatment and methods of application that have been examined. Fig. 6 shows similarly the relationship between extensibility and water imbibition, and Fig. 7 the relationship between wet initial modulus and water imbibition.

Thus emerges the most important result of this work, viz. that certain properties of viscose rayon yarns, including extensibility, dry tensile elastic

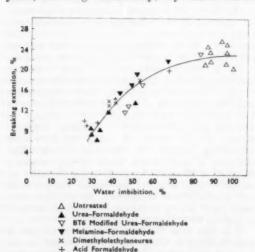


Fig. 8— Relation between Water Imbibition of Yarn and Breaking Extension

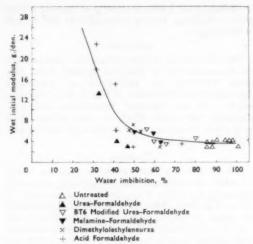


Fig. 7— Relation between Water Imbibition of Yarn and Wet Initial Modulus

recovery, wet initial modulus and water imbibition, are inter-related in a way which does not depend materially on the type of finishing treatment used. Fig. 8 is an attempt to express this four-way relationship in a single diagram representing a three-dimensional model, the heavy curve being the actual "graph" of the system. Values for water imbibition have been superimposed on this line. The other three curves are projections of the main line on to the plane of each pair of axes.

For the same degree of modification of yarn properties, different quantities of the different types of resin are needed, and quite small quantities of formaldehyde have the same effect on yarn tensile properties as large quantities of resin. Thus the choice of chemical finish must be based

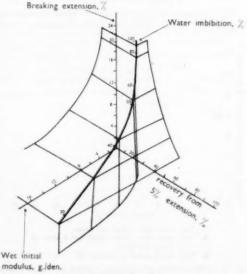


Fig. 8— Relation Between Tensile Elastic Recovery, Wet Initial Modulus, Breaking Extension and Water Imbibition of Yaru

upon considerations of fastness requirements, ease of application, ease of control, whether it is required to add weight to the fabric (which is not done by the formaldehyde treatments) and the fabric handle required. It can be assumed that, whatever known finish is used, the same limitations apply to the balance of yarn tensile properties. Other factors which may affect the final result of fabric treatments include the liability of the resin to form inter-fibre deposits which will seriously reduce the abrasion resistance and tear strength.

Improvements in fabric properties can be made by altering fabric structure and degree of yarn lubrication, but the amount of improvement is limited by other considerations. Thus, assuming that the recovery of a fabric from creasing ceases when the recovery forces are balanced by the internal frictional hindrances in the fabric, it would be expected that the crease recovery of a fabric would be improved by lubrication of the yarns. This is confirmed by Fig. 9, where the crease recovery of a set of similar fabrics treated with a range of softening agents is plotted against the inter-yarn friction. Crease recovery measured by the usual Shirley method 13 and friction by the fibre-fringe method 14. There is a strong tendency for fabries of low inter-yarn friction to have higher crease recovery. in a seam-strength test, all fabrics to the left of line AB slid apart at the seam, whereas those to the right reached full tear strength. This places a limit to the amount of lubrication applicable to a given fabric.

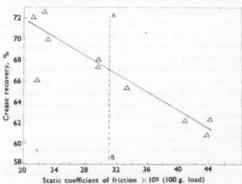


Fig. 9— Effect of Lubrication on Crease Recovery and Seam Strength

The present work sheds little light on what happens to the fundamental structure of the fibre during resin treatment. The curve of Fig. 7 has been re-plotted in Fig. 10 (solid line) using a logarithmic axis for initial modulus, regarding water imbibition as a limiting case of moisture regain and wet initial modulus as a limiting case of air-dry (or damp) modulus. It is noteworthy that not only resin-treated yarns, but yarns which have their moisture content reduced in other ways, lie on this curve. Thus the points at A are for samples treated in saturated steam 15, whilst the points at B are for normal viscose rayon yarns in atmospheres of various relative humidities 16

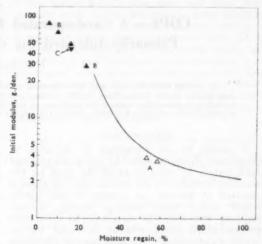


Fig. 10— Relation between Moisture Regain of Yarn and Initial Modulus

reported by du Pont; C is our own point for untreated viscose rayon yarn.

It would appear therefore that the operative mechanism by which the resin increases the wet initial modulus of the fibre is simply by excluding water. This is done equally well by a resin combination or by small quantities of formaldehyde. The evidence does not therefore support the postulate of a full three-dimensional network contributing to the wet stiffness. A more convincing picture is of covalent linkages giving a stiffer overall cellulose network, with the condensed resin, if present, in relatively discrete masses dispersed throughout the fibre.

The authors thank the many colleagues with whom continual discussions have been held during the progress of this work and the staff who have helped to carry out the measurements. They also thank the directors of Courtaulds Ltd. for permission to publish this paper.

COURTAULDS LTD.

RESEARCH LABORATORY DROYLSDEN MANCHESTER

(Received 11th April 1960)

References

- ¹ Marsh, J. T., Introduction to Textile Finishing (London:

- Marsh, J. T., Introduction to Textile Finishing (London: Chapman & Hall, 1946), p. 410.
 Idem, J.S.D.C., 75, 244 (1959).
 Cameron, W. G., and Morton, T. H., ibid, 64, 330 (1948).
 Marsh, J. T., Text. Manuf., 85, 294 (1959).
 Morton, T. H., J.S.D.C., 71, 815 (1955).
 Cooke, T. F., Dusenbury, J. H., Kienle, R. H., and Lineken, E. E., Text. Research J., 24, 1015 (1954).
 Buck, G. S., and McCord, F. A., ibid., 19, 216 (1949).
 Nuessle, A. C., Textile Ind., 123 (10), 116 (Oct 1959).
 Krasny, J. F., and Sookne, A. M., Text. Research J. 28
- ⁹ Krasny, J. F., and Sookne, A. M., Text. Research J., 25, 493 (1955).

- 493 (1959).
 Gagliardi, D. D., and Gruntfest, I. J., ibid., 20, 180 (1950).
 Guthrie, J. C., J. Textile Inst., 48, T 193 (1957).
 Kilby, W. F., Private communication.
 Methods of Test for Textiles (B.S. Handbook No. 11, 1975). 1956), p. 179. Lord, E., J. Textile Inst., 46, P 41 (1955).
- 14 Cooper, D. N. E., Private communication
- 14 du Pont, Technical Information Bulletin X-82 (1958), p. 14.

COPE—A Card-operated Process-timing Equipment Primarily Intended for the Control of Dyebaths

I. R. REYNOLDS

A dyeing machine may need the following on/off operations performed in a wide variety of timed sequences—water inlet, drain valve, steam, pump motor, dye feed, salt feed, finish feed. COPE provides an automatic control for all these, as well as for dyebath temperature and liquor level. Good reproducibility of shade has been obtained on repeat dyeings using this automatic control.

INTRODUCTION

It would be an advantage to be able to programme dyeing processes by means of a punched card system in order to avoid the need for the constant attention to the various controls which is required at present. A system of this nature would ensure that washing, dyeing, salting, finishing, etc., would be carried out at the correct predetermined times without the need for an operator's attention. The only manual operations required would be those of checking the shade and, possibly towards the end of the process, making small corrections on the first of a series of batch dyeings. A system of this nature would call for a fairly precise knowledge of the dye process in terms of times and concentrations of solutions required. At present, quite wide tolerances are allowed in dyeing, and in most cases corrections can be made to compensate for errors arising at some stage of the process. Having once determined the optimum programme for a particular dye or class of dye, a card would be punched appropriately and used on all further occasions for that type of dyeing.

A card-controlled process timer has been built that will automatically operate all the services required for a dyebath. The controls operated are salt, dye, finish, water inlet, steam, pump, and drain valve. In addition, it is possible to programme the card to stop the process and ring a warning bell at predetermined times to enable the dyeing to be checked. The temperature and level of liquor in the dyebath are also controlled. Preliminary trials have yielded satisfactory dyeings of repeatable shade.

GENERAL CONSIDERATIONS

The controller has been fitted to a Coventry design, two-arm (horizontal) cake-dyeing machine in the Droylsden Works Laboratory. It has been designed to govern the following operations at any time and in any sequence, depending on the information punched into the card—

Open and close water inlet valve (including level control)

Open and close drain valve

Open and close steam valve (including temperature control)

Open and close dye inlet valve

Open and close salt valve (including a device to pre-set the rate of addition of salt solution)

Open and close finish valve

Start and stop circulating pump motor

Check (this rings a warning bell and suspends all operations until attended to by the supervisor).

If a machine of this nature is to be useful, the following requirements must be met—

- (1) Reliability must be of the highest order, preferably with some means of selfchecking
- (2) Programming of the cards must be simple
- (3) Operations of the controller must be straightforward
- (4) All operations must fail "safe".

Standard G.P.O. equipment has been used in this machine, since it is of known reliability and easily obtainable at reasonable cost. All relays are of the type 3000. The selector is a 5-bank 50-contact uni-selector. All the relays and circuits have been built into a cabinet provided with a motor blower and fitted with an air drier. This is necessary, since conditions in a dyehouse are extremely humid and not at all suitable for the operation of electrical equipment.

THE PUNCHED CARD AND CARD READER

The punched card used for this machine has fourteen holes per row. Five of these are used for a time code, seven for the operation of the various controls, one for the check position (i.e. to stop the process for examination), and one at present is spare (see Fig. 1).

The cards used at present are made from 0.01 in. cellulose acetate sheet. Punching is performed with a special hand-operated perforator made in the laboratory. Cellulose acetate sheet has been used as it is less affected by humid conditions than paper or cardboard.

The five holes for the time code operate a group of five relays connected in a tree enabling any one of thirty-two positions to be selected, depending on the combination of holes punched on the card. A selector switch steps round at intervals of 1 min. or 5 min. (previously selected by means of a switch) until it "finds" the contact that is energised via the relay "tree". When this occurs the selector returns to its home position and the card reader is operated to bring forward the new instructions.

The card reader consists of a drum operated by an electromagnetic ratchet mechanism; attached at each end of the drum are 35 mm. film-sprocket wheels that engage in perforations down the side of the card. Between the perforations are the holes for the time code and channel operation. Contact to the drum is made via these holes by means of small steel-wire brushes.

It is possible to run a card through the machine manually in order to check that the punching is correct. It is also possible to inject fast impulses

			-	-	er in			×						
	Salt	Dye	Finis	Stear	Wate	Drain	Pumi	Chec	Spare	-	2	4	80	91
Starting	-			1						0				
Soak	-		1	0	0								1	0
Dyeing		0		0	0	1	0				1	0		0
Check								0				1		1
Dyeing				0			0				0	0	0	0
Dyeing				0			0				0	0	0	0
Check		1						0					1	
st Salt Add	0			0			0				0	0	0	0
st Salt Add	0			0			0				0	0	0	0
heck								0						
nd Salt Add	0			0			0				0	0	0	0
nd Salt Add	0			0			0				0	0	0	0
heck								0						
rain						0				0	0			
ill					0					0	0			
inse					0		0			0	0			
rain						0				0	0			
II + Finish			0		0						0			
nishing							0							0
heck								0						
Drain						0						0		

End of Process

Fig. 1-A Dyeing Programme on a Punched Card

(This diagram of a card indicates that after starting, the steam and pump are turned on for 16 min. Then the dye, steam, water, and pump are turned on for 20 min. Then all services are turned off during the check when the bell rings and wars the operator. Similarly the procedure continues for the rest of the programme.)

(1 per sec., instead of 1 per min. or per 5 min.) to enable a card to be run through the machine rapidly to check the operation of all the circuits.

CONTROLS

The controls on the front panel allow the process to be taken over manually at any stage. It is possible to operate the card manually, or cancel the operation so that a phase can be repeated out

Neon pilot lamps indicate the time that the particular operation in progress will be running, and "Digitrons" (numerical indicator tubes) indicate the time elapsed in that phase. A separate box has illuminated panels which indicate the particular services being operated. This can be mounted near the dyebath, although at present it is more conveniently resting on the main control cabinet.

In addition to the timing circuits, a level-control and thermostat are incorporated, so that the level and temperature of the dyebath will not need attention after being initially set. The level-control consists of a stainless steel tube with a central electrode. A low voltage is applied between this electrode and earth in series with a relay. When the dye liquor reaches the electrode, conduction takes place and operates the relay in the controller. This in turn operates the water inlet via the appropriate channel relay. Although this system of level control is probably not ideal, it is completely safe as the potentials are below 50 volts.

All electrically operated and pneumatically operated valves for air, water, steam, etc., are arranged to close on failure of the electrical or air supply.

The valves for the dye, salt, and finish were initially made in the laboratory, using modified government-surplus stepping motors driving a flat type of ground-glass tap of 3 mm. bore. These performed satisfactorily on the initial trials, but those for dye and finish have been replaced by ½ in. pneumatic valves, since in some cases a fast flow rate is desired for the addition of dye and finish. A valve is fitted on the salt feed, which also has a pre-set control for flow rate. The pump motor is started via a 230 v. contactor.

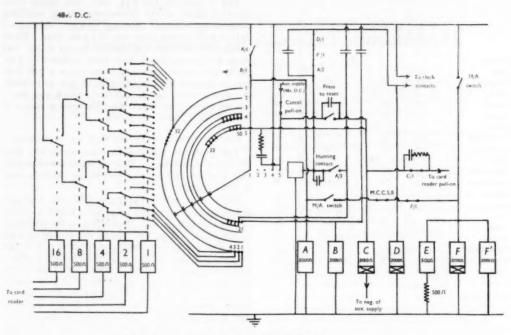
CIRCUIT DETAILS AND METHOD OF OPERATION

The holes are punched in rows across the card from one to fourteen. One to eight are channels, nine is spare, and ten to fourteen are the time code in binary units.

With the card in position and the manual/automatic switch in the automatic position, relays one to nine will operate, depending on the punching of the holes. Also, the timing relays will operate similarly, giving any combination of 1, 2, 4, 8 and 16 as a position on the relay tree from 2 to 32, 1 being the home position. When this occurs, the selector starts to step at intervals of 1 or 5 min. as relay A (Fig. 2) is de-energised owing to the route through the relay tree no longer being to the home position. The stepping action is controlled by a clock motor fitted with cams and micro-switches that switch on a supply to D relay and the selector.

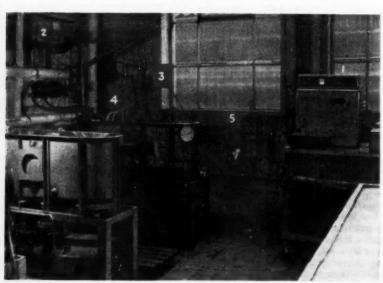
When this occurs the selector coil is energised. At the same time D is energised, but as it is damped, it takes about 200 millisec. to operate. When it operates it removes the supply to the selector, which then completes its "pull on" cycle. When the selector has stepped round and "found" the particular route through the relay tree corresponding to the programme time, relay A operates and starts the selector hunting back to the home position. The current for hunting flows via bank 4. At the same time, relay C operates from bank 5 on the selector to move the card reader on to the next position. When the selector reaches the home position, relay B operates and cancels relay A. Also, the current for hunting the selector comes via bank 4, and, since the home position is not connected to the selector coil, the selector stops hunting.

For manual operation the manual/automatic switch is placed in the manual position. This operates relay A (via F) and hunts the selector, as well as moving the card on. Hence, by operating this switch, the process is set to the beginning of the next phase, where it will start on returning to automatic. If it is desired not to move to the next phase on operating the manual auto-switch, the cancel button can be pressed. This will stop the card reader from moving on. In these circumstances, on returning to automatic the machine will start at the beginning of the existing phase. When it is required to stop the process as it is, without moving to the next or returning to the beginning of the one in progress, the check switch (channel 8) is operated before the manual/automatic switch. This stops the clocks and allows



All relay contacts are shown in supply-disconnected position Switches are in the off position (M.C.C.S. = Manual Control Channel Switch) Manual/Automatic (M/A) switch contacts are shown in automatic position

Fig. 2



I COPE

2 Feed tanks for salt, dye, and finish

ish

4 Dyebath level-control

3 Salt feed control

5 Pneumatic valves controlling main valves for steam, inlet, drain, dye, and finish

Fig. 3-COPE installed in the Works Laboratory

manual operation without disturbing the selector or the card reader. Relay E is also operated by the manual/automatic switch. This changes the channel relays over from card operations and connects them to the manual switches.

There is also on the panel a "re-set" button. This operates the card reader so that at any time the card can be moved to the next position.

In addition, it is possible to select the basic time interval as 1 min. or 5 min. or external as required, by means of switches on the front panel. Hence it is possible for the machine to run for $5\times31=155$ min. for one row on the card.

The controller has a set of double-pole heavy-duty contacts on each channel relay. These serve to operate the main valves on the dyebath by $\frac{1}{8}$ in. B.S.P. 230 v. solenoid valves. The main valves— for water inlet, drain and steam— on the bath are 1 in. valves that close on air failure.

THE USE OF COPE

In Fig. 3, the COPE controller is shown in the Droylsden works dyeing laboratory controlling a horizontal two-arm dyeing machine. During the first dyeing, the supervisor inspects the goods at the predetermined check points (see Fig. 1). He can then either repeat the previous cycle or switch to the next. When this dyeing is complete the timings are known for repeat dyeings, which may then be carried out automatically from start to finish. Good reproducibility of shade has been obtained on repeat dyeings. It is probable that this machine will be of greatest use for repeat dyeings, but it is also useful in first dyeings where the supervisor makes periodic checks.

Although self-checking facilities are not incorporated in this model, consideration has been given to this aspect, and they would probably be incorporated on future machines used on production work. A further refinement would be the control of dyebath temperature so that it could be increased over a period at a predetermined rate. Systems are known which would enable this to be carried out.

From the foregoing description it is evident that a machine of this type could be used for the control of a variety of processes apart from dyeing. Any process that requires the systematic operation of a number of sequences according to a predetermined plan could make use of this system.

It would be possible to elaborate on the basic idea almost indefinitely to enable the most complex processes to be controlled accurately with the minimum of supervision.

Thanks are due to Mr. G. Durrans of Droylsden Dyehouse who suggested an automatic control for a dyeing process and who was responsible for some of the initial trials, to Mr. J. A. Sutton for carrying out a large amount of constructional work on the instrument, and to Mr. J. C. Guthrie for advice and assistance in the preparation of this paper.

The instrument has been used mainly by Mr. T. A. Nutton in the Works Laboratory, and thanks are due to him for his close co-operation and suggestions for improvements in its use.

Thanks are also due to Mr. J. Boulton for his continuous encouragement and to the Directors of Courtaulds Ltd. for granting permission to publish this paper.

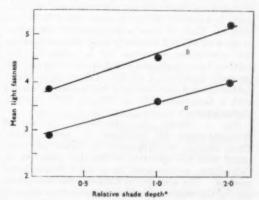
COURTAULDS LTD.
RESEARCH LABORATORY
DROYLSDEN
MANCHESTER
(Received 27th April 1960)

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents

Influence of Sulphonate Group Orientation on Light Fastness of Acid Wool Dyes

Dyes with planar molecules sulphonated at only one end (asymmetrically) are surface-active; symmetrically sulphonated dyes are not 1,2. The difference in surface activity of the two classes might be expected to be reflected in their light fastness on fibres, since one of the most important factors determining light fastness is the physical state of the dye in the fibre 3: molecularly dispersed dye fades more rapidly than dye in aggregates. The proportions of dispersed and aggregated dye, and thus the light fastness, will be influenced by the surface activity of the dye. In practice, an increase in surface activity usually reduces light fastness, probably because it promotes dispersion of the dye as a monolayer on the internal surfaces of the fibre. This has been shown by laboratory tests 1, and it can also be seen by an examination of information in the Colour Index. The dyes suitable for comparison, all sulphonated acid wool dyes, are C.I. 13065, 13080, 13015, 13085; 15970,



* Colour Index data for weakest depths are stated to be for 4-4 of standard depth. Here they are plotted as 4 of standard depth

Fig. 1—CFG (Characteristic Fastness Grade ^{26, 6}) Curves for (a) Unsymmetrically and (b) Symmetrically Sulphonated Acid Dyes on Wool

⁽British Data for C.I. 63000 and 63010, Continental Data for all others)

15510, 16100, 16230; 14830, 14910, 14720, 14835; 15625, 16180, 16050, 16250, 15620, 16045, 16255, 16290; 63000, 63010; 60730, 61530, 62085; 61570, 62550. When these are divided into asymmetrically and symmetrically sulphonated dyes, it is seen (Fig. 1) that the symmetrically sulphonated ones have the higher mean light fastness. This and other evidence (fading rate curves, etc.) suggests that symmetry of sulphonation favours aggregation in the fibre; how it does so is not yet

Further details will be published elsewhere. C. H. GILES

COLOUR CHEMISTRY RESEARCH LABORATORY DEPARTMENT OF CHEMICAL TECHNOLOGY ROYAL COLLEGE OF SCIENCE AND TECHNOLOGY GLASGOW, C.1.

12th August 1960

¹ Giles, Proc. 2nd International Cong. Surface Activity, 1, 92 (1957).

³ Cameron and Giles, J.C.S., 3140 (1957).

³ (a) Eaton, Gordon, and Giles, J.S.D.C., 68, 394 (1952); (b) Baxter, Giles, McKee, and Macaulay, ibid., 71, 218 (1955); (c) Giles, ibid., **73**, 127 (1957); (d) Baxter, Giles, and Lewington, ibid., **73**, 386 (1957); (e) Giles, and Lewington, ibid., 73, 386 (1957); (e) Weissbein and Coven, Text. Research J., 30, 58, 62 (1960).

Measurement by the Opal-glass Method of Absorption Spectra of Dye Adsorbed on **Fabrics**

In general, it is difficult to measure directly the absorption spectrum of a dye on a fabric. usual method of observing the light reflected from dyed cloth by using an integrating sphere is not completely satisfactory 1. The opal-glass technique developed recently by Shibata et al.2 for measuring the absorption spectra of translucent materials is simpler and may be applied to dyed cloth. The method had already been successfully applied to biological samples³, and it was therefore decided to attempt to extend the method to the spectroscopic investigation of dyed cloth.

The procedure is quite simple. A plate of opal glass (I mm. thick) is closely attached to one side of the dyed cloth (1.2 cm. ×5.0 cm.) and another piece is attached to the undyed cloth (reference sample). Each of them is placed in the cell holder in place of the cell normally used when measuring the absorption spectrum of a solution. The incident beam is allowed to fall on the cloth and the spectral distribution of the diffuse light transmitted through the cloth and opal glass is measured with a Beckmann DU or Hitachi EPU spectrophotometer.

Fig. 1 shows the absorption spectra of Benzopurpurin 4B adsorbed on cotton cloth. These spectra, which contain two bands, are compared with the spectrum of the dye adsorbed on Cellophane, as measured by a direct transmission method. The absorption bands of the dyed cloth are, on the whole, somewhat broader than those of dyed Cellophane and their band maxima (358 and 520 mu.) are at longer wavelengths than those of dyed Cellophane (345 and 515 mg.). The band

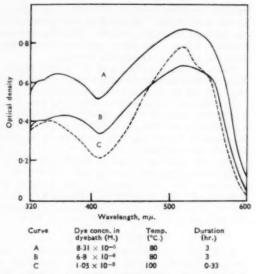


Fig. 1— Absorption Spectra of Benzopurpurin 4B on Cotton Cloth (Curves A and B) and on Cellophane (Curve C)

observed at 520 mu. for adsorbed dye has a "shoulder" near 550 mu. which does not appear in the spectrum of the aqueous solution of the dye. Although the apparent optical density obtained by the opal-glass technique cannot be simply related to the optical density determined by the ordinary transmission method, the present results show that the opal-glass technique is sufficiently useful for obtaining characteristic absorption spectra of dyes adsorbed on fibres.

Recently, Campbell et al.4,5 have used the absorption spectrum to obtain information on the physical state of dyes adsorbed on textile materials. They measured the spectrum by the ordinary transmission method, using solid films of Cellophane and gelatin as models of cellulose and protein fibres, respectively. By employing the opal-glass method, it will now be possible to extend such studies to all types of textile materials without having to use model substances.

> T. TACHIBANA M. OKUDA

CHEMICAL LABORATORY OCHANOMIZU UNIVERSITY BUNKYO-KU TOKYO JAPAN

7th August 1960

19591

1 Vickerstaff, T., The Physical Chemistry of Dyeing

 Vickerstaff, I., The Physical Chemistry of Dyesing (London: Oliver & Boyd, 1954), p. 51.
 Shibata, K., Benson, A. A., and Calvin, M., Biochim. Biophys. Acta, 15, 461 (1954).
 Shibata, K., "Spectrophotometry of Translucent Biological Materials", from Methods of Biochemical College of Commenced College (1998). s Shibata, Analysis, Vol. VII, edited by Glick, D. (New York,

4 Campbell, D. S. E., and Giles, C. H., J.S.D.C., 74, 164

⁵ Campbell, D. S. E., Catheart, D., Giles, C. H., and Rahman, S. M. K., *Trans. Faradoy Soc.*, **55**, 1631 (1959).

Notes

Chemistry of Fibrous Proteins

A post-advanced course on this subject will take place at the Bradford Institute of Technology on 18th and 19th November 1960. Lectures will be given on "Modern Techniques and Uses of Amino Acid Analyses", "Purification of Proteins", "Determination of Amino-acid Sequences in Protein Molecules", "Structure of Synthetic Polypeptides", "Structure and Properties of Wool Keratin", "Structure and Properties of Silk Fibroins". Time will be allowed for discussion. Full details and application forms are available from the Registrar of the Institute.

Course in Applied Microscopy and Practical Microphotography

The Institute for Applied Microscopy, Photography and Cinematography, Mollstrasse 40/42, Mannheim, West Germany, will be holding an advanced course on 21st—26th November 1960 under the direction of Dr. Ing. habil H. Reumuth. The fee for the course is DM 150. Further details are obtainable from the Institute at the above address.

British Records Association

The 28th Annual Conference of the Association will be held at Merchant Taylors' Hall, 30 Threadneedle St., London E.C.2, on 5th and 6th December 1960. The papers to be delivered will be "The Records of Protestant Non-conformist Bodies" and "The Use of Archives in Education (Pt. I—Principles and Practice; Pt. II—Presentation and Reproduction of Texts)". Details are available from the Honorary Secretary of the Association, The Charterhouse, London E.C.1.

Canadian Textile Conference

The Second Canadian Textile Conference will be held in the Queen Elizabeth Hotel, Montreal, on 7th–9th February 1961 on the theme "Style—Quality—Progress". Although this is basically an industrial conference, delegates will hear addresses from government representatives and prominent Canadian industrialists, and papers will be presented on technology, marketing, education and management.

Dye for Use in Heart Surgery

The dye-

has been developed in the Eastman Kodak Co.'s laboratory in response to a request for a dye that had a sharp peak at 8000 A. in the infrared. It is used to trace the blood stream. Arterial and venous blood absorb light equally and weakly at that wavelength, so that passage of a small amount

of the above dye in the blood causes an increase in the 8000 A. absorption as indicated by a photorecording galvanometer. The dye is quickly taken up by a healthy liver and excreted in bile. An unhealthy liver takes significantly longer, so that there is a prospect of eventually using the dye to detect unhealthy livers. The dye is being prepared for medical use and distributed as Cardio-Green by Hynson, Westcott & Dunning Inc., Baltimore 1, Md., U.S.A.

Tricyanovinyl Dyes

In recent years du Pont have been investigating a new class of compounds, the cyanocarbons. The first of these compounds to be prepared was tetracyanoethylene, a colourless, crystalline compound of high thermal stability which sublimes above 120°c., melts at 198–200°c., and boils at 223°c. When mixed with dimethylaniline, tetracyanoethylene gives a very bright red solution. This reaction is general and leads to the production of a new class of dyes, the tricyanovinyls. They give brilliant orange, red or blue dyeings on hydrophobic fibres such as polyethylene terephthalate and polyacrylonitrile. The dyes are still being studied.

Research at Bradford Institute of Technology

A booklet has been published which lists the subjects of research currently being undertaken in the Department of Chemical Technology at the Institute. In addition, details are given of Fellowships, Assistantships and Scholarships tenable in the Department, and papers published by members of staff since 1955 are listed. The booklet "Research" is available from the Registrar at the Institute.

Dye Production in 1958

Part 25 (Dyestuffs) of the Report of the Census of Production for 1958 is now available from Her Majesty's Stationery Office or any bookseller. The price is 1s. 11d., inclusive of postage.

Death of Member

We regret to report the death of Mr. E. A. Sack.

Meetings of Council and Committees September

Colour Index Editorial Board—2nd, 23rd

Finance and General Purposes—6th

Council-7th

Examinations Board-9th

Joint Committee with the Clothing Institute— 13th

Publications-20th

Mercer Lecture-23rd

Data on Identification of Dyes on Textile Fibres— 30th

COLOUR INDEX

Corrections

October 1960

VOLUME 1

		VOLUM	IE I	
Page				
1114	C.I. Acid Red 51	for read	Aizen Erythrosine FFBH	HCC
1132	C.I. Acid Red 93	for read	Aizen Rose Bengal B Aizen Rose Bengal	HCC
1134	C.I. Acid Red 98	for read	Aizen Acid Phloxine Aizen Acid Phloxine PB	HCC
1299	C.I. Acid Blue 158 or 158A	for read	Aizen Opal Blue GGH Aizen Opal Blue 2GLH	HCC
1300	C.I. Acid Blue 161	for read	Aizen Opal Blue RH Aizen Opal Blue BH	HCC
1311	C.I. Acid Green 9	for read	Aizen Brilliant Acid Green BH Aizen Brilliant Acid Green 6BH	HCC
1376	C.I. Acid Black 2	for read	Water Nigrosine W Water Nigrosine	W
1395	C.I. Acid Black 52	for read	Aizen Opal Black WA Aizen Opal Black WH	HCC
1451	C.I. Mordant Red 2 in the head	ling delete	"58255 and"	
1458	C.I. Mordant Red 15	transfer to	Mitsui Chrome Red B C.I. Mordant Red 7	MDW
1525	C.I. Mordant Blue 55	transfer to	Mitsui Chrome Brilliant Blue G2 C.I. Mordant Blue 47	K MDW
1588	C.I. Mordant Black 7	transfer to	Mitsui Chrome Black PB C.I. Mordant Black 11	MDW
1589	C.I. Mordant Black 9	transfer to	Mitsui Chrome Black P2B C.I. Mordant Black 7	MDW
1591	C.I. Mordant Black 13	for read	Mitsui Alizarine Blue Black B Mitsui Alizarine Black PB	MDW
1642	C.I. Basic Blue 9	for read	Aizen Methylene Blue FZH Aizen Methylene Blue FZ	HCC

VOLUME 2

2087	C.I. Direct Red 31	for read	Mitsui Direct Brilliant Red BX Mitsui Direct Brilliant Red B	MDW
2104	C.I. Direct Red 81	for read	Aizen Primula Red 4BLH Aizen Primula Red 4BH	HCC
2105	C.I. Direct Red 83	for read	Solar Rubinol B Solar Rubinole 3LR	S
2121	C.I. Direct Red 127 or 127A	transfer to	Benzo Fast Bordeaux 6BNL-CF Fenaluz Bordeaux 6B Fenamin Diazo Bordeaux 2BL C.I. Direct Red 127— C.I. 28215	G G
2135	C.I. Direct Red 173	for read	Coprantine Red GRLL	Ciba CAC, Ciba
2156	C.I. Direct Violet 47	for read	Solar Rubinol FBL Solar Rubinole 3LB	S
2169	C.I. Direct Blue 1	for read	Atulin Sky Blue FF Atul Direct Sky Blue FB	AP

VOLUME 2-continued

73		AVEL IN	- continued
Page	GI Direct Plan 76		
2197	C.I. Direct Blue 76 in the heading	for read	Disazo (metallised) C.I. 24410 (metal complex) Disazo
	ti	ransfer	Chlorantine Fast Blue 7GL CAC,
		-	Ciba
2224	C1 D1 - 111	to	C.I. Direct Blue 219 (new entry)
2224	C.I. Direct Blue 151	ansfer to	Mitsui Direct Copper Blue 2B MDW C.I. Direct Blue 168
2264	C.I. Direct Brown 2	for read	Atulin Brown M AP Atul Direct Brown MR AP
2338	C.I. Direct Black 38	for read	Atulin Black EX AP Atul Direct Black E AP
2380	C.I. Sulphur Blue 7	for read	Sulphur Asahi Blue FBB KKK Asathio Blue BB KKK
2383	C.I. Sulphur Blue 13	for read	Mitsui Sulphur Indigo MDW Mitsui Sulphur Indigo R MDW
2417	C.I. Sulphur Black 11	for read	Mitsui Indocarbon D MDW Mikeran Carbon D MDW
2521	C.I. Solubilised Vat Green 3	for read	Cibantine Olive 2B Ciba Cibantine Olive FB Ciba
2525	C.I. Vat Green 9	for read	Mikethrene Black BB MDW Mikethrene Black BBS MDW
2583	C.I. Azoic Diazo Component 13	for read	Showa-Kako Fast Scarlet Salt RC KKK Kako Scarlet R Salt KKK
2587	C.I. Azoic Diazo Component 22	for read	Mitsui Variamine Blue RT Salt MDW Mitsui Blue VR Salt MDW
		for read	Showa-Kako Variamine Blue R Salt KKK Kako Blue VR Salt KKK
2588	C.I. Azoic Diazo Component 25 tr	ansfer to	list of dyes and all information C.I. Azoic Diazo Component 14
2590	C.I. Azoic Diazo Component 28 tr	ansfer to	list of dyes and all information C.I. Azoic Diazo Component 14
2595	C.I. Azoic Diazo Component 35	for read	Mitsui Variamine Blue B Salt MDW Mitsui Blue VB Salt MDW
		for read	Showa-Kako Variamine Blue B Salt KKK Kako Blue VB Salt KKK
2608	C.I. Azoic Diazo Component 48	for read	Showa-Kako Blue Salt B KKK Kako Blue B Salt KKK
2613	C.I. Azoic Coupling Component 2	for read	Dragonthol AS DPI Dragonthol A DPI
2615	C.I. Azoic Coupling Component 7	for read	Dragonthol AS-SW DPI Dragonthol SW DPI
2618	C.I. Azoic Coupling Component 1	for read	Dragonthol AS-BS DPI Dragonthol BS DPI
	C.I. Azoic Coupling Component 18	for read	Dragonthol AS-D DPI Dragonthol D DPI

OBITUARY NOTICES

C.-M. Whittaker

Croyden Meredith Whittaker was born in Scarborough on 11 January 1878. School days at Barnard Castle were followed by studies at the Yorkshire College, Leeds, where he graduated B.Sc. in 1899. Immediately after graduation he joined the firm of Read Holliday & Sons in Huddersfield, but within a year, having decided that the formal study of chemistry was rewarding beyond the stage of a first degree, he went to Berlin University to work for a year under Emil Fischer. He returned to Read Hollidays, took over the dyeing laboratory at their works and

remained with them and with their successors, British Dyes Ltd., ultimately British Dyestuffs Corporation, until the end of March 1920. That date marks the beginning of his association with Courtaulds Ltd., which was to last until his retirement.

At the time he joined the man-made fibre industry, rayon was really beginning to make its way as a textile yarn produced on a massive scale as viscose rayon continuous filament. Samuel Courtauld invited C.M.W. to undertake the establishment of a dyehouse in the North of England. His remit was to place his organisation "somewhere between Halifax (Yorks.) and Leigh (Lanes.)" where Courtaulds

had weaving mills at which coloured yarns were required. He was then to do two things: dye cotton yarns for use in the cotton/viscose rayon union fabrics which were then a very large outlet for viscose rayon yarn, and to dye the continuous-filament rayon that Courtaulds and their immediate customers would need.

These were the early days of man-made fibres, and Whittaker immediately sought to discover in what ways the dyeing of rayon would require to be developed differently from the established techniques for cotton and silk. Now began a series of investigations into the suitability of dyes and dyeing machines for the optimum production of dyed viscose rayon yarn.

In establishing yarn-dyeing techniques, Whittaker instituted a series of tests for the selection of direct dyes with regard to their level-dyeing properties. It is not too much to say that his "temperature range", "time range" and "suction" tests, when considered together, provided the essential clues on which later researchers were to base their physico-chemical approach. Although Whittaker always claimed that his investigations were empirical and aimed at the

immediate practical solution of his dyeing problems, it can be said that some part of our earliest insight into dyeing kinetics and hence a general theory for dyeing processes, came from study of his technological work on the dyeing of rayons. He did much to establish a sound range of non-tendering vat dyes, which was essential to advance the use of all cellulosic fibres in furnishing fabrics. Apart from solving his own technical problems, Whittaker stimulated other research workers in the fibre and dye industries throughout the textile world. This stimulus was felt particu-

larly when in the later 1920's the development of rayon staple began, opening up new aspects not only of dyeing and finishing but of textile processing over the whole mechanical and chemical gamut.

Having established at Droylsden a commercial dyehouse for rayon yarn and fibres with a wide reputation for the quality of his work, and set up there also a laboratory which was virtually a research estab-lishment, Whittaker was elected to the board of Courtaulds Ltd. early in 1944 and remained a director until his retirement in 1950. Before he retired he saw his old laboratory at Droylsden housed in a modern building and augmented into a fully-fledged

research unit, and the dyehouse basically prepared for the expansion and modernisation which has since taken place at the hands of younger colleagues who trained under him.

Throughout his life, Whittaker devoted time and energy to a great number of external technical and scientific interests in many honorary capacities. For the Board of Trade he worked on the Joint Technical Advisory Committee and the Committees for Dyestuffs Licensing and Dyestuffs Development. Three times between 1935 and 1951 he was Chairman of the British Colour Council, having sat on its Board of Management since 1926. He gave much of his time to the affairs of the Textile Institute, the Society of Chemical Industry and, more especially, to the Society of Dyers and Colourists, of which, besides being a past-President, he was in 1955 made an Honorary Member. The Textile Institute gave him its Honorary Fellowship in the following year. In 1947 the University of Leeds conferred on him the Honorary Degree of Doctor of Science.

Whittaker appeared to many as an undemonstrative, reserved and critical character. In fact he was an intense and vivacious enthusiast



about the things that really interested him. Besides his work, and public lectures, committee discourses and private opinions all given with equal zest and premeditated point, he had a range of interests on which his observations were ever rewarding to his friends. The theatre and most forms of sport provided his amusements, and talking about them his relaxation. Shortly after retiring, Dr. Whittaker went to live in Scarborough, his birthplace. Thence he continued those sorties to the West-endtheatres, Lords, Old Trafford, Wimbledon, Wembley, Maine Road and elsewhere, according to season, which for many years he had enjoyed only when brief time could be snatched from business.

He is known to have said on retirement that "when you once put away your tools you waste your time to touch them again". In this, for once, Whittaker did not entirely follow his own precept. Right up to the year of his death he continued regularly to attend those conferences, symposia, lectures and the like where he could mix with old

friends, and he delighted still to throw the occasional illuminating thunderbolt at unsuspecting 'experts' who talked inside his field. And his was a wide field: wherever colour, chemicals and textiles are talked of, C. M. Whittaker will be remembered for a very long time to come.

JOHN BOULTON

Arthur Robinson

Arthur Robinson of Turton, Bolton, who died on 28th July 1960, was a member of the Society for more than forty years. He started his career at Sackville & Swallow Ltd., calico printers, of Pendlebury, Manchester, and later became Chief Dyer at Horrobin Mills, Turton, Bolton. During World War II he held responsible positions at branches of the Bleachers' Association Ltd., but immediately afterwards he returned to Sackville & Swallow Ltd. as Chief Chemist, a position which he occupied at his death.

A. E. STUBBS

New Books and Publications

Handbook for Chemical Society Authors Special Publication No. 14

Pp. vii + 224. London: The Chemical Society. 1960. Price, 21s. 0d. (6s. 0d. to Fellows of the Chemical Society).

In this handbook, information for Chemical Society authors on style, symbols, nomenclature etc., previously scattered through several Chemical Society and other publications, is brought up to date and assembled in a convenient readable form. Three-quarters of the book is devoted to chemical nomenclature: the rules of the International Union of Pure and Applied Chemistry (I.U.P.A.C.) for inorganic and organic nomenclature are presented together with a commentary in footnotes giving the actual usage of the Chemical Society when this differs from the I.U.P.A.C. recommendation or where the I.U.P.A.C. rules admit of alternatives; nomenclature which is not yet internationally accepted but is the subject of U.S.A. and British agreements is given; and there are also reprints of miscellaneous recommendations made by the Chemical Society from time to time. It is generally accepted that in chemical matters Chemical Society usage should be taken as a guide in British scientific journals; to a large extent this applies to the Society's Journal, and the handbook should be very valuable to the editorial staff and to authors of papers and abstracts.

The reviewer does not suggest, however, that the nomenclature rules presented in the handbook should be applied rigorously to all chemical matter appearing in the *Journal*. The demands of tradition cannot be wholly resisted, particularly in a technical context; the primary requirement is that the reader shall understand what is written and, if he is a practical man acquainted with the uses of "sodium hydrosulphite", "potassium ferrocyanide", "diphenyl", and "dimethylolurea", he may not readily recognise these substances

under the names of "sodium dithionite", "potassium cyanoferrate(II)", "biphenyl", and "bishydroxymethylurea", though he may well appreciate occasional educative parentheses which may help in preparing for the ultimate elimination of the grosser illogicalities and inconsistencies. Also, it should be noted that the nomenclature adopted for dyes and intermediates in the Colour Index is that of the Subject Index of Chemical Abstracts, and it is generally desirable to maintain uniformity in the Society's publications in this field. It is fortunate that differences from Chemical Society nomenclature are generally not great, and recent changes in Chemical Society practice have tended to bring it still more closely in line with the usage of the Subject Index of Chemical Abstracts.

Some of the more important changes in organic nomenclature have already been described in this Journal (75, 197 (1959)); only a few, still more recent, changes will be mentioned here. The internationally recommended use of "bi-" for assemblies of two identical cyclic systems has at last been adopted, but "bi-" is prefixed to a radical name and not, as in the Chemical Abstracts Subject Index, to the name of a compound (Chemical Abstracts has "biphenyl" as a concession to tradition, but has "1,2'-binaphthalene" and "2,2'-bipyridine" where the Chemical Society has "1,2'-binaphthyl" and "2,2'-bipyridyl"); "ter-" and "quater-" are now used with compound names, apart from "benzene", in British, as in American, nomenclature, e.g. "tercyclopropane". Many will be glad that the name "glyoxaline" has finally been abandoned, and the internationally more acceptable "imidazole" has been adopted together with the very convenient imidazoline and imidazolidine names for the hydrogenated forms; the name "pseudoindole" is also abandoned and replaced by "3H-indole". The extensive list of heterocyclic parent compounds will be found very useful.

Incorrect and confused nomenclature is, unfortunately, all too common in British and American journals, and in illustration of this the reviewer cannot resist mention of his pet aversion, namely, the use of a hybrid nomenclature for alcohols in which n- or iso- is prefixed to the Geneva name: there appears to be a belief that the meaning of "n-" includes that of "primary", so that the name "n-butanol" refers only to butyl alcohol (butan-1-ol) and not to s-butyl alcohol (butan-2-ol), which has an equal right to be called "n-butanol" since it is also derived from n-butane by replacement of H by OH (the use of "n-" in the names of organic compounds and radicals is now regarded as unnecessary except for the purpose of emphasis); another example is the common use of "isopropanol" (propan-2-ol or isopropyl alcohol), a name which leads one to wonder what sort of substance isopropane is and how it differs in structure from propane. Another common example of illogical nomenclature is "alklyarylsulphonic acid" (in place of "alkylarenesulphonic acid"). In such simple cases, however, there is rarely any doubt about the author's meaning, and it is when such illogical treatment is extended to more complex organic compounds that real confusion can occur, as the reviewer has frequently noted during proofreading of the Journal. In the reviewer's experience ambiguity and incomprehensibility are found most frequently in abstracts of foreign chemical journals, and the handbook is particularly recommended to the notice of the authors of such

Apart from the sections on nomenclature and allied topics, the handbook contains a reprint of the Chemical Society's brochure "The Presentation of Papers to The Chemical Society". This contains some valuable advice on good English and good style and, though there are some differences in the conventions of the two societies, many of our authors would undoubtedly benefit from a study of this section (Chapter 1).

A. E. STUBBS

Natural and Synthetic Fibers Yearbook 1959

Edited by Milton Harris and H. Mark. Pp. iii + 1339. New York and London: Interscience Publishers 1959. Price, \$60.00.

This book consists of 505 abstracts, some very little shorter than the originals, of patents and published papers. Of these abstracts, 83 refer to U.S. Patents, 418 to English-language publications and the remaining 87 to foreign-language publications. The majority of the English-language papers abstracted are taken from four journals (Text. Research J. 150, Amer. Dyestuff Rep. 76, J. Textile Inst. 64, J.S.D.C. 23), the remaining 22 abstracts being taken from 13 other journals. Similarly, the majority of the 87 abstracts of foreign-language publications are from four journals (Bull. Inst. Text. France 23, Faserforsch. u. Textiltech. 22, Melliand Textilber. 14, Textil-Rund. 12), the remaining 16 abstracts being from 6 other journals. The only Russian journals abstracted are Kolloid Zhur. (5) and Zhur. fiz. khim. (1), and there are no references to Japanese publications.

Although it is claimed that the material abstracted was "originally published in 1959", many abstracts refer to papers published during the latter half of 1958, and in a few cases much earlier. For example, the solitary reference to Textil-Praxis is to an article in the January 1957 issue. The abstracts of J.S.D.C. papers cover the period August 1958–September 1959.

After a careful study of the 23 references to J.S.D.C. papers it is not easy to see how papers are selected for inclusion in the Yearbook. Thus. although the F.T.C.C. paper "The Measurement of Colour Fastness to Steam Pleating" (January 1959) is included, those on "Colour Fastness to Daylight at High Humidity" and "Assessment of Weathering Fastness" (November 1958) are not. The paper "Flameproofing of Textile Fabrics . . . Read and Heighway-Bury in the December 1958 J.S.D.C. is abstracted, that by Prefect on "Flameresistant Finishing of Cellulosic Fabrics" in the same issue is not. Moreover, there is no mention of W. G. Crewther's paper "The Supercontraction of Wool Fibres by Aromatic Compounds" (April 1959), although the Yearbook contains an abstract of a paper by Crewther and L. M. Dowling on supercontraction in solutions of salts, acids and alkalis.

In the Preface it is claimed that the abstracts are so detailed that "in many cases workers will not find it necessary to refer to the original works". The few examples given above, however, make it obvious that the original journals will still have to be consulted to see what matter has not been abstracted. Not only that, but where an abstract is given, reference to the original may still be valuable. For instance, there is no indication in the abstract of the paper "The Measurement of Colour Fastness to Steam Pleating" that the method (with additions) has been accepted by I.S.O./TC38/SCI as a tentative standard test.

The reviewer of the 1957 Yearbook (J.S.D.C., 74, 863 (1958)) claimed that, from the point of view of obtaining value for money (the Yearbook then cost \$45), it was "altogether not a very good buy". Now that the price is \$60, this opinion can be endorsed, only more so.

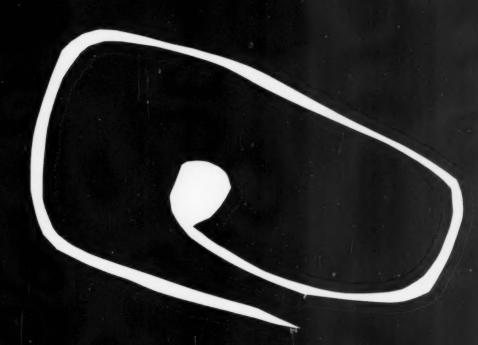
M.T.

Technique of Organic Chemistry Volume 1 Physical Methods of Organic Chemistry

Part II

Edited by A. Weissberger. Third completely revised and augmented edition. Pp. xii + 895-1797 + 21. New York and London: Interscience Publishers. 1960. Price, 184s, 0d.

Interscience Publishers. 1960. Price, 184s. 0d.
The progress of practically any branch of chemical research is now dependent upon the application of physical methods. The treatise "Technique of Organic Chemistry", of which Volume I, "Physical Methods of Organic Chemistry", is a part, deals essentially with one branch of the subject. Although the chief aim has been to provide information for workers who are dealing with organic chemical problems, much



LEUCOPHOR

FLUORESCENT BRIGHTENING AGENTS FOR TEXTILES

Leucophor NB cellulosic materials Leucophor D Leucophor C

Leucophor B Leucophor R

cellulose; wool: acid stable, pink tone

Leucophor PA nylon; wool; best light and wash fastness

Leucophor WS acetate, wool, nylon, casein plastics

Leucophor DC vinyl and styrene plastics: solvent soluble, for dry cleaning



SANDOZ PRODUCTS LTD., CALVERLEY LANE HORSFORTH LEEDS TEL: HORSFORTH 4646

for resin finishing

SEMI-PERMANENT FINISHING

HOSIERY FINISHING

CARPET BACKSIZING AND BACKING

NON-WOVEN FABRIC BINDING

HEAT-SEAL COATINGS

PIGMENT BINDING

YARN SIZING

* The Textile Section of our Technical Service Laboratories will be glad to help with your problems.

VINYL PRODUCTS LTD CARSHALTON SURREY

Phone: Wallington 9282

A member of the Reichhold Chemicals Ltd. Group.

The fastest wins

Trial by Regatta. Sun-scorched. Wind-swept. Sea-sprayed. But after constant wash and wear the colour stays fast. For dyeing wool in colours of best, all-round fastness, Chrome wins.



CHROME

Sodium Dichromate Sodium Chromate Potassium Dichromate Potassium Chromate

Photo: Eileen Ramsay

Sales enquiries to

Associated Chemical Companies (Sales) Limited

P.O. BOX NO. 6, LEEDS 1. PHONE: LEEDS 29321/8. GRAMS: ASCHEM, LEEDS.

Λc \c

Quality Dyes & Products

Excellent basis for heavy brown shades on loose wool, slubbing and yarns

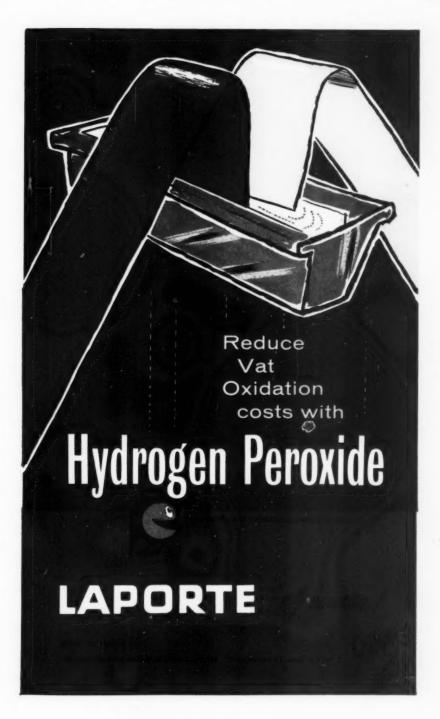
ELITE FAST RED BROWN V CONC

Excellent wet fastness

Suitable for bordeaux shades on silk and nylon

& B.

For Samples and Quotations apply LB HOLLIDAY & CO LTD HUDDERSFIELD





*Reactone

the new reactive dyes

Salient features

in printing and padding

Reactone dyes give prints and dyed shades of outstanding brilliance.

Reactone dyes are intermiscible and can be used to produce a very wide range of shades. Reactone dyes form a chemical linkage with cellulosic fibres and thus ensure outstanding wet fastness.

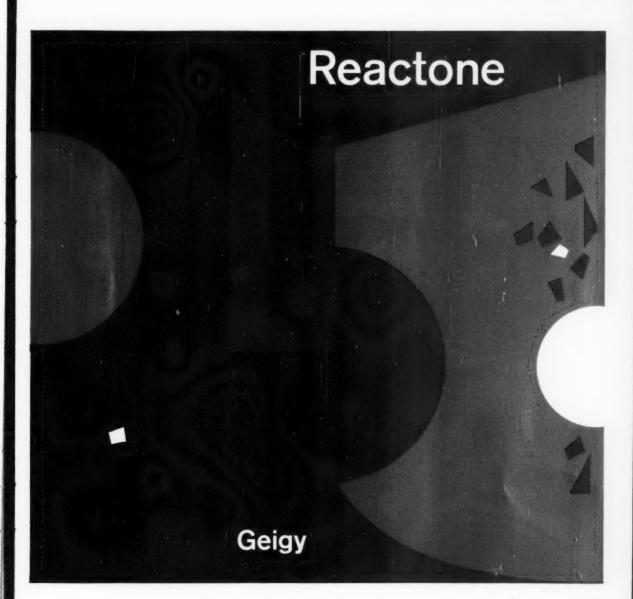
Reactone dyes have exceptionally good stability. Alkaline print pastes and pad liquors remain stable for several weeks without loss of strength. Reactone dyes have no affinity for the fibre in the absence of electrolytes; consequently washing off of hydrolysed dyestuff presents no difficulty.

Uses

Printing: screen and roller printing. Dyeing: heat fixation, one-bath/steam, pad-jig and pad-batch processes.



The Geigy Company Limited Rhodes Middleton Manchester



Pre-eminent colours for printing and padding

for the textile industry

SOFTENING AGENTS

for all fibres, include the following

SAPAMINE WP permanent softener for resin application.

SAPAMINE OC for polyamide fibres.

SAPAMINE PA for acrylic fibres.

SAPAMINE WL for wool.

RESINS

LYOFIX CH, LYOFIX PR, LYOFIX AS and UREOL AC PASTE: Modified Urea and Melamine Formaldehyde Resins used in the production of "Drip Dry", "Crease Resist", "Anti-Shrink" and Mechanical Effects.

Special catalysts are available for use with the resin range.

HANDLE FINISHES

Non-curable resins VIBATEX AN CONC. 150%, VIBATEX S and DICRYLAN WG: applicable to natural and synthetic fibres.

DYE FIXATION

Fixation of substantive dyestuffs by LYOFIX EW, LYOFIX SB CONC. and DYFIX PA.

VAT DYEING ASSISTANTS

ALBATEX PON CONC, and STABILISER VP CIBA, the latter specially developed for vat pigmentation techniques.

DETERGENTS OR WETTING AGENTS

Non-ionic agents for use in preparatory processes and wet processes generally.

FLOCK PRINT ADHESIVES

FIXER 611 CONC. CIBA and ORAFIX PF for wash fast effects.

WATER REPELLENT AGENTS

PHOBOTEX FT giving excellent wash-fast finishes for dress goods and outer-wear fabrics. MIGASOL PJ — Stable was emulsion for water repellent finishes.

OPTICAL BRIGHTENERS

A full range of optical brightening agents includes UVITEX RT for cotton, wool and nylon fibres, and UVITEX ERN CONC. for polyester fibres, with outstanding light fastness

CIBA CLAYTON Limited

Clayton Manchester 11 Telephone East 1341 (16 lines) Telegrams Cibadyes Manchester 11

Sole Concessionaire in the U.K. for CIBA Ltd Basle Switzerland

In these stills at the No. 2 Factory of B.I.P. Chemicais Limited takes place the controlled reaction between urea or melamine and formaldehyde—first stage in resin production.

the buying public lies a long chain of technical endeavour.

One of the many factors which will determine the success of the finish is the degree of control exercised not only during application of the resin, but also during resin manufacture. This is well appreciated by B.I.P. Chemicals Limited, and as resin manufacturers of more than three decades' experience they are in a unique position to ensure the maintenance of first quality standards. Careful control, rigid testing at each stage and the accumulated 'know-how' of many years of experience—these are some of the secrets

of the success of Beetle Textile Resins.

Between the evolution of a finish and its acceptance by

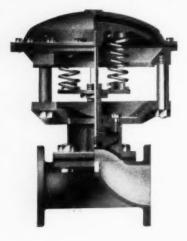
the secret of a perfect finish

extile

B.I.P. CHEMICALS LIMITED



78, Mosley Street, Manchester, 2. Telephone: Manchester Central 9614



DIFFERENT

- - to make possible otherwise impossible controls

With power actuation, remote and automatic control and the constant development in diaphragm composition much more will yet be accomplished



The snowball growth of chemical engineering is in no small measure due to the Saunders Valve

Many products and processes which today are commonplace were impracticable before the advent of Saunders Diaphragm closure and isolation - -The diaphragm makes sure closure and isolates delicate or dangerous fluids from the mechanism





GIVE
YOUR
PRODUCTS
THE
PROTECTION
THEY
DESERVE

MYSTOX rot-proof

On test, under all conditions, MYSTOX formulations by Catomance stand out as by far the most practical and versatile rot-proofing agents.

And the specification MYSTOX assures you of much more than effective proofing alone. In addition, you benefit from the specialised Catomance service, the technical representative team whose job it is to give you necessary advice on individual products, the Catomance Laboratories that will provide the answer to special formulation problems as well as pass on to you the benefits of routine analysis and biological testing. Give your products the protection they deserve—MYSTOX by Catomance.

MYSTOX

Pentachlorophenyl Laurate rot-proof for textiles, packaging materials, canvas and cordage, PVC and rubber, electrical insulants, paper, timber protection against all rotting organisms . . . bacteria, fungi, insects non-toxic, non-corrosive no objectional colour or odour.





MYSTOX by CATOMANCE helps proof a good product better

CATOMANCE LTD

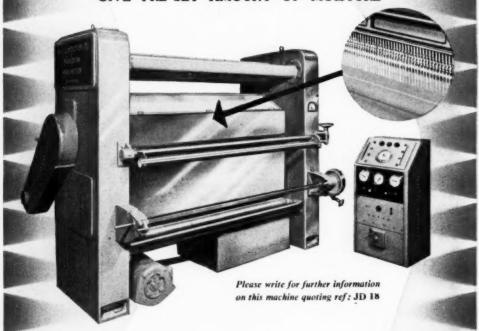
M BRIDGE ROAD EAST . WELWYN GARDEN CITY . HERTS . TEL: WELWYN GARDEN 4373

CORRECT CONDITIONING FOR MODERN FINISHES

WITH THE NEW PATENT 'MIST' SPRAY HYDRO-CONDITIONING MACHINE

Designed for accurate and even application of moisture, this machine will condition both sides of the cloth simultaneously or, if required, on one side only. The cloth is conditioned whilst travelling vertically to eliminate drops or streaks. This machine is ideal for the finishing of cotton, rayon, linen, flax and other woven fabrics.

ELECTRONICALLY CONTROLLED TO GIVE PRE-SET AMOUNT OF MOISTURE





HUNT & MOSCROP LTD

P.O. Box No. 8, Middleton, Manchester

Telephone: Middleton 2476-7-8

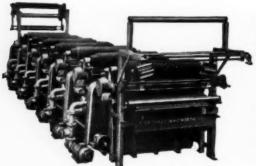
London Office

154-157 Temple Chambers, Temple Avenue Telephone: Ludgate Circus 7796-7 EC4 dmHM18



open width WASHER





SETS THE STANDARD BY WHICH WASHING MACHINES ARE JUDGED

This machine has high production records and will process the lightest to the heaviest fabrics

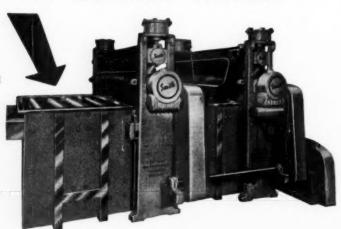
AUTOMATIC CONTROLLED TENSION THROUGHOUT

for WOOLLENS and WORSTEDS

use the 'EXPRESS' WASHER

A TREMENDOUS SAVING IN CHEMICALS, WATER AND LABOUR

On one type of woollen cloth the production was increased 13 times on the old rope scouring method



ask for descriptive literature

F SMITH & CO (WHITWORTH) LTD

WHITWORTH

ROCHDALE

LANCASHIRE

Telephone Whitworth 2233

Telegrams AUTOJIG WHITWORTH



SUITABLE FOR PAD JIG

PACKAGE DVEIN

Water alubia sulplus dyes givin

GOOD PENETULATION

SETTER HANDLE

EASY WASHING OF

ESS TROUBLESOME EFFICUENT

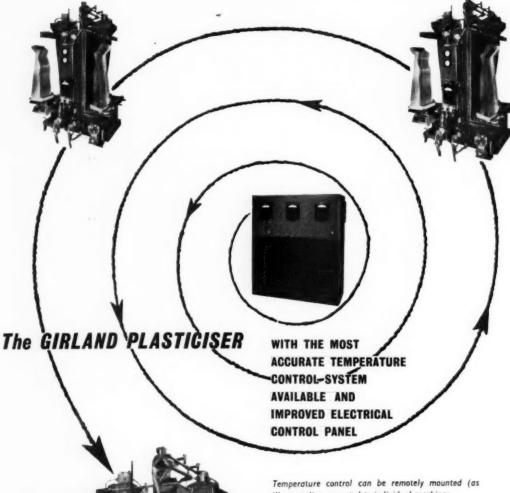
DYESTUFFS

IR.

JAMES ROBINSON & CO LTD

HILLHOUSE LANE HUDDERSFIELD ENGLAND

Telephone Huddersfield 334 and 335
Telegrams ROBINSON HUDDERSFIELD



illustrated) or mounted to individual machines

The features which make the GIRLAND PLASTICISER the most successful machine of its type-

- I Control of temperature to ± 4°C
- 2 Heater units for post-boarding the heavier weights of Nylon, "Terylene" and Agilon hose
- 3 A great advance in air venting giving absolute uniformity of temperature in steaming chamber
- 4 Low steam consumption

ANDREW THE

ENGINEERING & DEVELOPMENT

COMPANY LIMITED

Manufacturers of Hosiery Dyeing and Finishing Machinery

Jennison Street Bulwell Nottingham

Telephone 27-8566 (4 lines)



LEVAFIX

An interesting group of Reactive dyestuffs for fast prints and dyeings on cellulosic fibres

DYESTUFFS

Fixation by a simple heat treatment



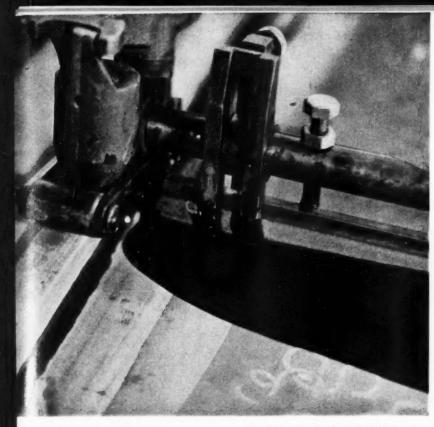
BAYER LEVERKUSEN GERMANY

Distributors in Great Britain:

Industrial Dyestuffs Ltd.,
Bonding House, 26 Blackfriars Street, Manchester, 3,
29 Elmbank Crescent, Glasgow, C.2.
Cater House Buildings, 1 Cater Street, Bradford, 1,
Finsbury Pavement House, Moorgate, London, E.C.2.
31 Kingsdale Park, Knock, Belfast.

Canadian Distributors: Verona Dysstuffs Limited, 2150 Ward Street, Montreal 9, 113 Sterling Road, Toronto, 3, Irish Distributors:







Cibacron Turquoise Blue GF is the latest addition to the Cibacron range. It is a brilliant turquoise blue for dyeing and printing which builds up very well and which has very good all-round fastness. One of its main features is the ease with which unfixed colour can be washed off. There is no danger of white grounds being stained, even in hard water. Please ask for our dyeing and printing circulars.

A new reactive dye with excellent washing off properties

Cibacron Turquoise Blue GF

Original CIBA product

CIBA CLAYTON LIMITED

Clayton Manchester 11 Telephone East 1341 (20 lines) Telegrams Cibadyes Manchester 11

Sole Concessionaire in the U.K. for CIBA Ltd Basle Switzerland

Registered trade-mark





DISCRIMINATING

DYERS AND

made sure with

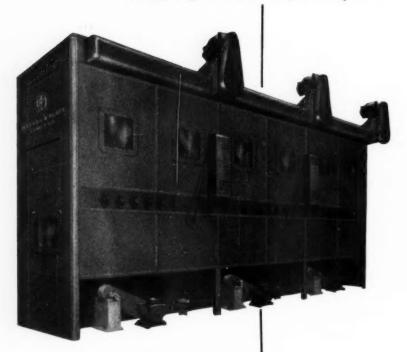
SERISOLS



THE YORKSHIRE DYEWARE & CHEMICAL GO. LTD., LEEDS.

EFFICIENCY WITH ECONOMY

The Hot Flue Drying machine achieves double the output of previous designs occupying the same floor space



OUTSTANDING FEATURES

- * Thermostatically controlled hot air
- * Automatic adjustment of cloth tension
- * Three stage controlled drying
- * Even heat application at each stage
- * Full heating chamber insulation . . .

make this machine ideal for drying padded or dyed cloth

Mather & Platt Ltd supply modern machinery for all aspects of the textile finishing industry



Telephone COLlyhurst 2321

Telegrams MATHER MANCHESTER

PARK WORKS MANCHESTER 10

information is given on tested methods and the relevant theoretical background to make the book of general value to all research workers. The student also will find much of interest and will be able to increase his understanding of the methods described. The work as a whole has been well received and widely used for many years, and in the third edition of "Physical Methods" new topics have been added and the previous contents brought up to date, so that four parts now appear, together comprising Volume I. In Part II, "X-ray Microscopy" by W. C. Nixon appears as an added feature.

The methods used for the measurement of rates of diffusion under a variety of conditions are adequately described, including those which have been commonly applied to dyes, and the more recent considerations of diffusion in polymers. Reference is made in particular to the calculation of particle size, to which purpose a large portion of all diffusion measurements is devoted. While it must be admitted that in a work of this nature much detail must be by way of reference, which in general is admirably done, there is a disappointing lack of reference to dye systems. Also, the methods of studying the polydisperse systems of proteins and polymers are given only by reference. Such subject matter is much more satisfactorily dealt with in the chapter on the ultracentrifuge, as might be expected from the history of the subject. The progress that has been made in solving the problems of concentration dependence and polydispersity in the application of the ultracentrifuge to the high-polymer field is described and some useful data are tabulated.

An excellent theoretical treatment of refractive index and the methods of measurement are given. The standard types of refractometer (Abbé and Pulfrich) may sometimes be unsuitable; an adequate treatment is given here of the use of the spectrometer, the polarimeter, the microscope and the interferometer, in addition to suggestions for the modification of commercial instruments. Unfortunately, there is no specific reference to work on fibres, but the content of the chapter

should still be of great value to those interested in this aspect of refractive index measurement.

Two short chapters, one on crystal morphology and another on crystallochemical analysis, are followed by an account of light microscopy. In this the general principles of microscopy are given and the more recent developments of phase contrast, interference, and fluorescence microscopy are outlined; in addition, the use of ultraviolet and infrared radiation is illustrated. Mention is also made of the "flying spot" microscope, which has great potentialities, particularly since very little illumination of the object (not necessarily with visible radiation) is needed to produce a bright image on the screen. The treatment of refractive index and birefringence given here considerably augments the information given under "refrac-These applications, together with methods for the measurement of dichroism and for relating colour to constitution, make this a valuable chapter for the applied chemist.

An account of microspectroscopy follows the above work and indicates methods which are finding increasing application, particularly in the study of individual fibres, small crystals, and tissues. These methods can, in principle, be applied to any spectral region and do therefore provide a potential source of information for structural analysis.

X-ray microscopy is a relatively new technique and as yet unproven in the field of organic chemistry. It finds a place in this volume and is a welcome addition to the well-established subjects of electron diffraction, X-ray diffraction, and electron microscopy, which are also included. The techniques of neutron diffraction, which have developed more rapidly since high-intensity neutron sources became available from nuclear reactors, are adequately represented.

There is here a compilation of methods which should relieve the chemist of much searching through the literature. The information is clearly presented and can be absorbed with relative ease. There appear to be very few errors and the work can be highly recommended.

ERIC COATES

New Books Received

- The Chemistry of Natural Products. Volume IV— The Natural Pigments. K. W. Bentley. Pp. vii + 306, New York and London: Interscience Publishers, 1960, \$5,00.
- British Standards Yearbook 1960. Complete to 31st December 1959. Pp. iii + 592. London: British Standards Institution. [1960]. 15s. 0d.
- Handbook for Chemical Society Authors. Special Publication No. 14. Pp. vii + 224. London: The Chemical Society. 1960. 21s. 0d. (Fellows 6s. 0d.).
- Forschungsberichte des Landes Nordrhein-Westfalen. No. 828. Disposition mit Arbeits- und Vertriebsvorbereitung in der Tuch- und Kleiderstoffindustrie. Deutschen Tuch- und Kleiderstoffindustrie. V. Köln und Ausschuss für Wirtschaftliche Fertigung E. V., Düsseldorf. Opladen: Westdeutscher Verlag. 1960. Pp. 67. DM 17.90.
- Textile Recorder Annual and Machinery Review. Book of the Year 1960-1961. Pp. 110 + 70 advertisement pages. Manchester and London: Harlequin Press (1955) Ltd.

- Natural and Synthetic Fibers Yearbook 1959. M. Harris and H. Mark (editors). Pp. iii + 1339. New York and London: Interscience Publishers. 1959. \$60.00.
- Acrylic Resins. MILTON B. HORN. Pp. vii + 184. London and New York: Chapman & Hall Ltd. and Reinhold Publishing Corpn. 1960. 36s. 0d.
- Forschungsberichte des Landes Nordrhein-Westfalen, No. 865. Ermittlung des Gebrauchswertes von Handtüchern verschiedener Qualität. Josef Lig. Pp. 45. Opladen: Westdeutscher Verlag. 1960. DM 13.20.
- Forschungsberichte des Landes Nordrhein-Westfalen. No. 819. Einkommen und Textilverbrauch. H. H. KAUP. Pp. 92. Opladen: Westdeutscher Verlag. 1960. DM 23.20.
- Plastics Progress 1959. Papers and discussions at the International Plastics Convention 1959. PHILLIP MOBGAN (editor). Pp. xii + 216. London: Iliffe & Sons Ltd. (Published for "British Plastics"). 1960. 55s. 6d.

Forschungsberichte des Landes Nordrhein-Westfalen. 816. Die Bewetterung chemisch modifizierter Wollgarne. Herausgegeben durch das Kultusminis-terium. H. PFANNMÜLLER, M. PFANNMÜLLER, and H. ZAHN. Pp. 31. Opladen: Westdeutscher Verlag.

Vibration-Rotation Structure in Absorption Bands for the Calibration of Spectrometers from 2 to 16 Microns. E. K. Plyler, A. Danti, L. R. Blaine, and E. D. Tidwell. N.B.S. Monograph 16. Pp. ii + 20. Washington: U.S. Department of Commerce. National Bureau of Standards. 1960.

Verfmethoden voor Mengsels van Polyester- en Cellulosevezels. F. H. ROBAARD. Mededeling No. 11 Delft: Vezelinstituut T.N.O. 1959. Pp. iv + 49.

Chemical Analysis. Volume XII - Systematic Analysis of Surface active Agents, MILTON J. ROSEN and H. A. GOLDSMITH. Pp. xvii + 422. London and New York: Interscience Publishers. 1960. 102s. 0d,

Symposium on Dyeing and Finishing Textiles. Melbourne 1959. SOCIETY OF DYERS AND COLOURISTS OF AUSTRALIA. Pp. ix + 143. 1959. Melbourne: J. Brear Esq., c/o ICIANZ Ltd., 529 Lonsdale Street.

Forschungsberichte des Landes Nordrhein-Westfalen. No. 850. Massänderung und Faserbeanspruchung von Wäschestoffen bei verschiedenen Trocknungs-Verfahren. OSWALD VIERTEL. Pp. 34. Opladen: Westdeutscher Verlag. 1960. DM 10.70.

Technique of Organic Chemistry. Volume I. Part 2—
Physical Methods of Organic Chemistry.

A. Weissberger (editor). Pp. xii + 903 + 21.
Third completely revised and augmented edition 1960. New York and London: Interscience Publishers, 184s. 0d.

Abstracts from British and Foreign Journals and Patents

The titles of abstracts may be modified. Abbreviations of names of firms are listed in 1.S.D.C., 68, 23 (Jan. 1952), and also, together with symbols and the periodicals abstracted, in the annual index

I - PLANT: MACHINERY: BUILDINGS

Steaming Processes in Preparation and Bleaching Textile Machinery Exhibition

Melliand Textilber., 41 (Jan 1960) 59-61 semicontinuous machine built by Matériel Textile du Rhone is described. This is based on two-stage impreg-nation. Fabric passes through a large vat, a hydraulic nip, a tension compensator, and a small mangle whose lower bowl is immersed in a small trough fitted with a constant-level device. A preheating space and a hotconstant-level device. A preheating space and a not-storage chamber, in which the fabric is formed into a batch, follow. The main application is in chlorite bleaching. Economic features are stability of the cold liquor in the first vat without ClO₂ formation—activator is applied in the second pad—and freedom from corrosion by the use of synthetic materials of construction for first vat, steam-preheating space and storage chamber, e.g. a polyvinyl chloride-polyester copolymer. Application to desizing is also described. Chlorite concn. found suitable are 2.5% for linen, 1.5% for cotton for $1\frac{1}{2}$ hr., 0.3-0.4% for viscose rayon and cellulose acetate for 10-15 min. Polyamides are very rapidly bleached, using ammonium bifluoride as activator. As dulled fibres are prone to subsequent discoloration due to further oxidation of ${\rm TiO_2}$, a final reducing treatment is advocated.

Open-width Dyeing and Finishing of Fabrics o Cellulosic, Man-made or Blended Fibres W. T. Swatek

Melliand Textilber., 41 (June 1960) 746-749 Apparatus for an open-width treatment of pieces is manufactured by Svetemo, Göteborg, Sweden. The following are described in some detail: desizing, pad-roll, bleaching, and washing machines.

Polymerisation Oven using Propane as Fuel

Melliand Textilber., 41 (June 1960) 753-754

The machine manufactured by SACM together with Antargaz uses infrared elements which burn propane. The apparatus can be used either by itself or stenter. In case of stoppage, supply of gas is automatically interrupted and sliding shields protect the pieces. The condensation chamber is made of polished aluminium sheets. Element temperatures up to 900 c. can be reached.

PATENTS

Scouring and Milling Machines BP 842,056 (26 Feb 1958)

Of a pair of kneading blades at least one is mounted on a horizontal axis so as to oscillate thereon. Both blades are mounted so that when their upper edges are apart they form a downwardly tapering gap through which the cloth is passed. Adjustable plates to receive the cloth after it has left this gap are placed at an angle to one another at the lower end of each blade so as to leave an adjustable channel for the cloth. These plates are secured to the blades so that they participate in the blades' oscillations. The cloth is continuously fed to the gap so that it is forced into transverse folds therein and is there subjected to effective pressure by the blades. It remains sufficiently long between the blades for the necessary amount of scouring or milling to be obtained despite the fact that it is continuously moved through the lower delivery gap between the blades. The blades may be perforated to allow detergent liquor to pass through them in either direction. This causes the liquor to be forced through the fabric and sucked back, which intensifies the scouring

Cop for Dyeing D. Delerue

BP 836,885 (16 July 1956) The varn is wound on to a support as a cone. A short length of it is wound spirally from the large end to the small end of the cone and reversely. Thus only a small length of the yarn receives any variation in dye caused by the dye liquor having to pass through the thickness of the cop. The support consists of a perforated conical plate which defines the angle of the cone formed by the cop and forms an internal support for it.

Dyeing Jig Whiffen & Sons BP 836,251 (14 Aug 1957) The vat has a recessed base containing at least one of the guide rollers. Both the guide roller(s) and the batching rollers are contained within the vat which preferably has a removable lid. This enables the use of a very short liquor and in the case of vat and sulphur dyeing enables the cloth to be below the liquor throughout dyeing.

Device for Obtaining Samples of Liquor from a Drum Dyeing, etc., Machine

W. L. Ingle and Edward Wilson & Son

BP 839,055 (22 Nov 1957) A test tank is connected to the supply tank and has an outlet connected with a liquid inlet of the drum. pump is placed between the test tank outlet and the drum inlet, the drum's outlet being connected to a side inlet of the test tank. The floor of the test tank is below the normal liquor level in the drum. This enables samples of the circulating liquor to be taken from the test tank at any time without slowing down or stopping the drum.

Squeeze Rollers, Calenders, etc. E. Kusters BP 836,859 (17 June 1958) The pressure roller is arranged as a floating roller in a trough-like container. The container is filled for the whole length of the roller with a pressure liquid acting on the surface of the roller remote from the co-acting roller or Sealing devices contact the periphery and the ends of the roller. The roller is prevented from moving transversely while rotating. This ensures that the roller

exercises uniform pressure throughout its length. The pressure liquid may be the same as that with which cloth passing through the machine has been treated.

High-speed Roll Press for Extracting Water from a Wet Web

Dominion Engineering Works BP 841,441 (9 Dec 1957)

Guiding Mechanism for Moving Cloth, Paper, etc. I. L. Fife BP 840,929 (14 Sept 1956) I. L. Fife

Rollers which Prevent Lateral Movement of Cloth Passing Over Them

Phillips & Sons (Manchester) BP 841,050 (15 May 1956) A pair of interengaging longitudinally fluted resilient rollers radiused at their tips and roots prevent lateral travel of cloth passed between them under tension con-C.O.C. trolled by the speed of the rollers.

Automatic Control and Lateral Guiding of Cloth, Paper, etc., being Discharged from a Machine M. Rawe BP 841,773 (Germany 5 Apr 1956)

Airing and Heating Festooned Cloth or Paper

Maschinenfabrik Benninger BP 840,972 (Switzerland 19 Sept 1955)

Machine in which the siting of the propeller fans results in regular and rapid drying without turbulence being caused in the drying air.

Driving Mechanism for Screen Printing Machines Colden Manufacturing Co. BP 835,586 (30 Jan 195

BP 835,586 (30 Jan 1957) Mechanism which intermittently drives the cloth an accurate distance each time it operates and which allows the distance moved to be varied to suit requirements. C.O.C.

Drying Machine Spooner Dryer & Engineering Co

BP 835,899 (12 Sept 1956)

Laundry or Dry Cleaning Machines

BP 841,783 (22 Nov 1957) Baker Perkins

A drum-type machine so designed that the portions of the load near to the end wall or door of the cage are neither compressed nor caused to cling to the end wall or the door. This results in uniform treatment of the whole of the load.

Sprinkling Powders on to Fibrous Fleeces

VEB Zentrale Entwicklung und Konstruktion für den Kraftfahrzeugbau BP 841,762 (5 Dec 1956)

Apparatus for applying powder uniformly to a moving carded lap without any fear of the powder clogging despite either presence of moisture or the particles tending to adhere to one another.

Diazotype Printing Apparatus General Aniline BP 840,391 (U.S.A. 10 July 1956) Apparatus which makes duplicates of both opaque and transfucent originals.

Continuous Process for Diazotisation (IV p. 601) Furnace Black (C.I. Pigment Black 7) (IV p. 604)

Removing Residual Soap and Detergent from Laundered

Goods (VII p. 607)

Development of Standfast Patent Continuous Molten-metal Vat-dyeing Processes (VIII p. 609)

Developing Latent Electrostatic Images (IX p. 610) Coating Moving Web with Liquids (XI p. 613)

III - CHEMICALS: AUXILIARY PRODUCTS: FINISHING MATERIALS

Oxidative Changes of Compounds with Pyrocatechol Structure

I- Oxidation Influence of Different Reagents

Kozarstvi, 9 (1959) 266-269

II-Principal Reaction Mechanisms in Presence of O₂ and H₂O₂ Ibid., 295–299 J. Amer. Leather Chem. Assocn., 55 (July 1960) 414

Compared with other polyphenols, pyrocatechol readily oxidises. In aqueous solution at pH > 7 the oxidation products are dark humic substances and unstable red compounds, probably of quinoid nature. Hydrolysable tannins also contain phenolic OH groups and are readily oxidised with darkening as are also phenolic derivatives of

flavan-catechols which undergo auto-oxidation to red products—catechol tannins. The mechanism is similar to the formation of melanins (C.I. Natural Brown 9) or purpurogallin. Oxidation of lignin is described. Know-ledge of the auto-oxidation of phenolic substances makes possible choice of more stable substances for manufacturing Quinoid substances may form during condensasyntains. Quinoid substances may form during contensa-tion with HCHO, with consequent reddening of the product. This reaction may be hampered by formation of -CH(CH₃)- bridges by condensation with CH₃CHO or completely prevented by forming -C(CH₃)₁- bridges by condensing with acetone. C.O.C.

Preparation of the Cellulose Solvent Cadoxen

A. Donetzhuber

Svensk Papperstidning, 63 (31 July 1960) 447-448

A method of preparing Cadoxen is described which uses so little Cd that its price is brought down to that of the copper-ethylenediamine complex.

Low Foaming Detergents

General Aniline BP 838.975 (U.S.A. 6 June 1957) A mixture of a compound of formula-

$$R^{2}$$
 $O(CH_{2}CH_{2}O)_{n}H$

(R1 = H or Alk; R2 and R3 = Alk of > 5 C; R1, R2 and R3 together contain > 13 C; n = number of ethoxy groups needed to impart solubility in water) (5-30 parts), alkali metal phosphate or borate (20-60), another water soluble inorganic salt (10-40) and a water-soluble higher polymer derivative of starch, lichenin, xylan or cellulose (0-5), has excellent detergent properties and little tendency to foam.

Detergents Imparting an Antistatic Finish to Nylon

British Nylon Spinners ritish Nylon Spinners BP 839,407 (31 Oct 1957)
Addition to a mixture of an anionic detergent and neutral or alkaline water-soluble inorganic salt of a small proportion of a cationic surfactant, e.g. trimethyloctadecylammonium chloride, imparts an antistatic finish to nylon treated with it. The cationic surfactant is first mixed with sufficient of an inorganic salt to prevent it and the anionic detergent mutually precipitating one another.

Stain Removers

C. Vanoni BP 838,025 (24 Oct 1956)

A mixture of (a) one or more aromatic, aliphatic or halogenated hydrocarbons, and mono- or di-hydric alcohols of 1-5 C, (b) rectified petroleum jelly as an "antidrier" (c) silica gel as a gelatiser, and (d) finely powdered tale, bentonite and farina, is useful for removing any type of stain from cloth without leaving a ring mark.

Polyglycol Ether Derivatives—Levelling Agents for Wool Dyeing

Ciba BP 837,950 (Switzerland 15 July 1955) Compounds of formula-

$$\begin{bmatrix} R_{1}^{i} \underbrace{\int}_{i} (CH_{2})_{R+1} \underbrace{\begin{bmatrix} N \cdot (CH_{3})_{R+1} \end{bmatrix}_{N}^{i}}_{N} \\ -G \end{bmatrix}_{R-1}^{i} \end{bmatrix} \xrightarrow{OCR^{3}} \begin{bmatrix} -A \\ -B \end{bmatrix}_{g-m}$$

(R¹ and R² = aliphatic hydrocarbon radicals; R¹ + OCR² contain > 19 C and each is of > 7 C; $A = (CH_2CH_2O)_kCH_2CH_2OH$; B and C = A but with k replaced by r and s respectively; k, r and s = whole numbers; k+r+s=19-99 when m=2 and k+r=19-99 when m=1; m and n=1 or 2), e.g. N-cetylethylene diamine monoacylated with coconut fatty acid and then condensed with 80 mol. ethylene exide, are levelling agents in wool dyeing.

Vinyl Heterocyclic Nitrogen Compounds Polymers Thereof Rohm & Haas Co.

BP 838,817 (U.S.A. 9 Sept 1955) Compounds of formula-

(A = alkylene of 2-3 C of which < 2 form a chain between the 2 N atoms; Z = alkylene or cycloalkylene of < 19 C; R¹ and R² = H, phenyl, benzyl, cyclohexyl, Alk of 1-18 C or alkanyl of 2-18 C, or together = morpholino, piperidino, or pyrrolidino residue forming a ring with the N atom in the formula), e.g. 1-(3-aminoethyl)-3-vinylimid-azolidin-2-one, are used as inhibitors of gas-fume fading, water-repellent agents for cellulosic materials, detergents and dispersing agents, and react with formaldehyde to form aminoplast resins useful as textile finishes. Some of them readily form polymers and copolymers useful in the treatment of cellulosic textiles and paper.

Aminoplast Resins as Finishing Agents for Textiles, Paper and Leather

Süddeutsche Kalkstickstoff-Werke

BP 835,597 (29 Mar 1957) A mixture of (1) a precondensate of HCHO with dicyandiamide or melamine and containing at least one methylol group per NH₂ group and (2) a nitrogenous salt of an inorganic or an organic carboxylic acid condensable with formaldehyde, there being 85-65% by wt. of the first and 15-35% of the second component of the mixture, e.g. a mixture of tetramethylol melamine and dicyandiamide mononitrate, is used for impregnating textiles, paper or

Quaternary Ammonium Polymers Rohm & Haas Co. BP 835,550 (U.S.A. 21 Mar 1955) Copolymers containing \$ 30 mole % of units of

(R¹ = H or CH₃; Y = CONR¹ or COO; A = alkylene of 2–10 C which may be substituted by one or more OH groups, \leq 2 of the C atoms form a chain between N and Y; R^2 and R^3 = separately a satd, or ethylenically unsatd. hydrocarbon of $1-4~\mathrm{C}$ or together = morpholino, pyrrolidino, piperidino or N-alkyl piperazino; R^4 = benzyl or a satd. or ethylenically unsatd. hydrocarbon of $1-4~\mathrm{C}$; X = negative salt-forming atom or radical) and $\ll 5$ mole % of a unit of formula-

CH. CR1-CONHR5

(R5 = methylol or alkyoxymethyl) and/or one of formula-

$$(R^{6} = NHCONHR^{5} \text{ or } -N NR^{5}$$

have an extremely wide field of use, e.g. as antistatic agents for hydrophobic fibres, for inclusion in spinning dopes to modify the dyeing properties of fibres formed from them, sizes, water-repellent agents, etc. Their complicated method of manufacture is described in detail.

Polymers containing Hydrazide Groups Ciba BP 839,377 (Switzerland 16 Aug 1955) Copolymers containing ester groups are treated with hydrazine or hydrazine hydrate. The products have many uses depending upon the copolymer chosen, e.g. they can be used as lacquer resins, those containing many chlorine groups can be used as flame-resisting finishes, those containing quaternary ammonium or amine-salt groups as antistatic agents or for increasing the wet-fastness properties of direct dyes. 26 examples. C.O.C.

Polymers and Copolymers of N-(β-Trichloro-α-oxyethyl)-amides of αβ-Unsaturated Mono- or Dicarboxylic Acids

BP 835,579 (Switzerland 23 Dec 1955) The title amides, e.g. CH₂·CH-CONH-CHOH-CCl₃, are obtained by treating chloral with an amide of an 23unsatd. mono- or di-carboxylic acid containing $\ll 1$ H atom bound to the amide N atom. They readily form polymers or copolymers which are rendered insoluble by heating, e.g. at 120-160°c. or can be cross-linked, e.g. by

treatment with a di- or poly-isocyanate. The products have a wide range of uses, e.g. as textile auxiliary agents, for coating textiles, leather or paper, or as lacquer resins. C.O.C.

Water-soluble Latent Catalysts for Curing Resin Finishes

BP 841,640 (12 June 1957) ICI Water-soluble halogeno-1,3,5-triazines are used. Thus cotton cambric is impregnated with 80% of its wt. of a solution of NN'-dimethylol urea (10 parts) and Na (4,6 - dichloro - 1,3,5 - triazinylamino)naphthalene - 6 sulphonate (1) in water (89). It is then dried to 10% moisture content and embossed between two steel plates for 1 min. at 150° c., the lower plate being flat and the upper one carrying the design. It is finally baked for 3 min. at 150° c. The resulting embossed finish has good durability to washing.

Modified Polyacetals as Textile Finishes

Quaker Chemical Products Corpn.

BP 842,279 (27 Jan 1958) The water-soluble condensate obtained by treating (1) the reaction product of a polyalkyleneglycol (alkylene of 2-4 C) and an aliphatic, carbocyclic or heterocyclic aldehyde of 1-8 C and (2) an amino triazine, there being 1 mol. aminotriazine to 4·5-15 mol. polyalkylene glycol and 0·5-1·0 mol. aldehyde to 1 mol. polyalkylene glycol, is used to produce dimensional stability and crease-recovery properties in cellulosic textiles. Thus cotton recovery properties in cellulosic textiles. Thus cotton cloth treated with the product obtained by refluxing paraformaldehyde, diethylene glycol, p-toluene sulphonic acid first with water and then with melamine, dried under tension and cured for 5 min. at 300°r., has excellent dimensional stability and crease-recovery C.O.C. properties.

Water-repellent Finish

BP 835,596 (27 Mar 1957) Presence of free fatty acids in methylolamide compositions has a very considerable effect on the water repellency given to textiles treated by the compositions, much superior results being obtained by reducing the amount of free fatty acids present, preferably to < 2% by weight C.O.C. of the methylolamide.

Chloroplatinic Acid as Low-temperature Curing Catalyst for Siloxanes

BP 842,674 (U.S.A. 14 June 1957) Midland Silicones Chloroplatinic acid, even in almost negligible amounts, is an extremely potent catalyst for causing compounds containing silicon-bonded hydrogen atoms to react with compounds containing hydroxy groups. It also brings about faster, lower-temperature polymerisation and curing of organosiloxanes.

Borohydrides as Reducing Agents for Hair

BP 835,247 (29 June 1955) Société Monsavon l'Oreal Borohydrides, e.g. K borohydride, are excellent reducing agents for hair. Their action is rapid and brief. They are hygroscopic but can be readily used when dispersed in water-soluble, low melting point, synthetic waxes.

Furan Derivatives as Rodent Repellents

Virginia-Carolina Chemical Corpn

BP 841,720 (23 Oct 1957)

Impregnation with a wide variety of furan derivatives, e.g. 0.5-2.5% of ethyl 2-furoate, renders textiles, paper or other materials repellent to rodents.

C.O.C. or other materials repellent to rodents.

Softening Agents for Vinyl Chloride Polymers Chemische Werke Hüls

BP 841,805 (Germany 7 May 1958)

Compounds of formula

$$\overset{R^1}{\underset{R^2}{\swarrow}} CH_9 \overset{R^3}{\underset{R^4}{\swarrow}} CH_9 \overset{R^6}{\underset{R^6}{\swarrow}}$$

(R1, R2, R3, R4, R5 and R6 each = H or monovalent Alk, cycloalkyl or aralkyl), e.g. dibenzyltoluene, are softening agents for vinyl chloride polymers. C.O.C.

Sodium Aluminium Silicates as Fillers, Flatting Sodium Aluminium Santa Agents, Paint Extenders, etc. BP 841,831 (30 Oct 1956)

The complex of oxides of Al, Na and Si of average particle size $< 50 \text{ m}\mu$. containing 60-85% $8iO_2$, 2-30% Al₂O₄, 1-5% Na₂O and 10-15% H₂O are useful as fillers for rubber, and as flatting agents, extenders, and freeflowing additives for paints.

Influence of Surfactants on Fibre Properties (VI p. 605) Anhydrous Silicon Tetrachloride or Boron Trichloride as Carbonising Agent (VII p. 607)

Polymers of Unsaturated Carbamato Ethers and Thioethers (XIII p. 615)

IV-RAW MATERIALS; INTERMEDIATES; COLOURING MATTERS

Colour Isomerism and Structure of Some Copper Co-ordination Compounds

III—Structure of NN'-Disalicylidenepropane-1,2-diamine Copper Monohydrate F. J. Llewellyn and T. N. Waters

J.C.S. (June 1960) 2639-2643 A two-dimensional X-ray analysis of the title epd. indicates the copper atom to be quinquecovalent, the ligands being arranged in pyramidal configuration with four "normal" planar bonds and a fifth copper-water bond (length 2.53 A.) perpendicular to this plane. quinquecovalency is in accord with the previous suggestion (cf. J.C.S. (1959) 1200, 1203) that green cpd. of this type should exhibit a co-ordination number greater than four.

IV-Structure of NN'-Disalicylidene-ethylene-

diamine Copper
D. Hall and T. N. Waters Ibid., 2644-2648 A similar analysis to that of III (above) shows that the title cpd. is dimeric, with two copper-oxygen bonds (of length 2.41 A.) binding the two units of the dimer in a manner similar to that in copper dimethylglyoxime (cf. Frasson, Bardi, and Bezzi, Acta Cryst., 12 (1959) 201). There is some distortion of the mol. to allow formation of the dimer while maintaining van der Waals contact distances between non-bonding atoms. The configuration about the quinquecovalent copper atoms is pyramidal as expected.

 2,4-Dinitrophenol-Thiourea System
 A. F. Bogoyavlenskiï and L. N. Senina
 Zhur. obshch. khim., 30 (May 1960) 1684-1685
 The phase diagram of the 2,4-dinitrophenol-thiourea system has revealed the presence of two addition cpd.: yellow C₅H₂(NO₂)₂OH-CS(NH₂)₂ (m.p. 165°c.) and orange 4·C₆H₂(NO₂)₂OH·CS(NH₂)₂ (m.p. 118°C.). G.J.K.

Mechanism of Diazotisation of Aniline at High Acidities

B. C. Challis and J. H. Ridd

Proc. Chem. Soc. (July 1960) 245 The diazotisation of aniline is studied spectrometrically in 66–74% sulphuric acid and in 57–61% perchloric acid, where the stoicheiometric nitrous acid is largely converted into ionised nitrosonium salts. The results appear to be inconsistent with any mechanism involving a ratedetermining nitrosation of the amino group, and indicate that a new factor, the rate of proton transfer to the medium, can become important at high acidities. This argument is supported by the nuclear magnetic resonance spectrum of aniline in 60% sulphuric acid. The diazotisation of p-toluidine and of p-nitroaniline shows similar results at high acidities. H.H.H.

New Developments in Water-insoluble Azo Dyes Produced on the Fibre by Coupling W. Kirst Melliand Textilber., 41 (July 1960) 851–853 Greens of very good fastness properties can be obtained

by forming a metal complex on the fibre. This can be done (1) addition of a metal-complex salt to the usual alkaline boiling aftertreatment bath, or (2) addition of metal salt to the developing bath which contains the diazotised Variogen Base 1, raising the temperature to the boil and subsequently boiling with a non-ionic detergent with addition of Trilon B (ethylenediaminetetra-acetic acid). Cpd. suitable for complex formation are listed. For discharge work a process has been devised whereby the complex is formed after printing and steaming. Absorption Spectra of Dyes. V—Composition and Intermolecular Charge-transfer Spectra of Complexes formed in Aqueous Solution of the Mixture of Chlorazol Sky Blue FF (C.I. Direct Blue 1) and Chrysophenine G (C.I. Direct Yellow 12) T. Kobayashi, Y. Tanizaki, and N. Ando

Bull. Chem. Soc. Japan, 33 (May 1960) 661–666

The title geophisation has been recompany for higher

The title combination has been examined for higher complex formation and to interpret the remarkable spectral data afforded on the basis of quantum chemical concepts. It is definitely established that 1:1- and 1:2complexes are formed, and that their absorption spectra can be drawn from the experimental data by means of the calculated equilibrium constants. It is then shown, by valence bond and molecular orbital methods, that these spectra are interpreted on the assumption of charge transfer from Chlorazol Sky Blue FF to Chrysophenine G in the complexes.

Structure of Aromatic Diazo Compounds B. A. Porai-Kouhits Uspskhi Khim., 28 (1959) 1036–1051 Chem. Abs., 54 (25 May 1960) 9805

Detailed review with 156 references up to 1958. All reactions of the diazo cpd. may be expressed in terms of loss or gain of HO⁻, H⁺ or acid (A)⁻ ions among the following forms: RN:NA. RN₂⁺, RN:NOH, RN₂O⁻, and

Transformations of Triphenylmethane Dyes in Acid Media. I- Determination of Basicity Constants of

O. F. Ginzburg and P. M. Zavlin

Zhur. obshch. khim., 30 (May 1960) 1479–1485

The effect of substituents (X) in the phenyl nucleus, which does not contain a dimethylamino group (DA), on the basicity of DA in Malachite Green (C.I. 42000) has the basicity of DA in Malachite Green (C.I. 42000) has been investigated spectrophotometrically and the corresponding basicity const. (pK₀) for DA calc. (X = H; o., m., or p.{NO₂; CH₂; or Cl}; o., or p.SO₂H; or m.NO₂. o-CH₂). X in o-position to the central C atom imparts stability to the molecule (high pK₆ values, except for X = o-Cl), and the use of o-derivatives of C.I. 42000 as indicators is advocated in preference to C.I. 42000 itself. Kinetic data of pH-dependent changes of optical density of These derivatives of presented the sense of an isobestic point in the absorption spectra (340–700 m μ .) for $X = o.SO_3H$ (pH = 6.86; 1.81; 0.42; 0.19; 0.13) indicates that only I and II are present.

$$(CH_3)_3 \stackrel{+\delta}{N} \stackrel{+\delta}{\longrightarrow} \stackrel{+\delta}{N} (CH_3)_3$$

$$(I)$$

$$(CH_3)_3 \stackrel{+\delta}{N} \stackrel{+\delta}{\longrightarrow} \stackrel{+\delta}{N} (CH_3)_3$$

$$\downarrow \stackrel{+\delta}{\longrightarrow} \stackrel{+\delta}{\longrightarrow$$

Deeply Coloured Fluorenequinones G. Schwarzenbach and P. Waldvogel

Helv. Chim. Acta, 43 (15 June 1960) 1086-1112 Tetrahydroxytriphenylmethane cpd. (aurine dyes and their reduction products) derived from pyrocatechol, when heated with amines in vacuo or oxidised by oxygen in alkaline soln., are readily converted into deeply coloured substances, which can be reduced to colourless leuco-cpd., the reduction and re-oxidation being thermodynamically reversible and furnishing a Pt electrode with a well-defined

G.J.K.

potential. These dyes are the first fluorenequinenes to be described in the literature, and the following are reported: diamino (I), bis-methylamino , bis-ethylamino , bis-n-butylamino , and dihydroxy 9-o-chlorophenyl-fluorene-quinone (II); they are characterised by analysis, UV absorption- and IR-spectra, acid-base indicator behaviour, oxidation-reduction potential, and ability to form metal complexes

Synthetic Dyes. XVII- Synthesis of Azomethins by Synthetic Dyes. AVII— Synthesis of Azontetians by Condensing Quaternary N-Arylquinaldinium Salts with a-Nitroso-\(\theta\)-naphthol

G. T. Pilyugin and S. V. Shinkorenko

Zhur. obshch. khim., 30 (May 1960) 1656-1660

Six azomethin dyes, e.g.

 $(Ar = C_4H_5; C_4H_4; CH_3; p, \alpha; or \beta; C_{10}H_7)$ have been prepared by condensing N-arylquinaldinium iodide or perchlorate with nitrosonaphthol and their absorption max. (540-740 mμ.) in 7 different solvents determined; colour is solvent-dependent. Dyes are sensitive to light most G.J.K. markedly in CCl

Methylidyne Dyes from Organometallic Compounds: Diferrocenylmethylidyne Perchlorate Tetrahedron Letters (21) (1959) 1-4

Chem. Abs., 54 (25 May 1960) 9871 The Vilsmeier primary complex C₄H₅NHCH₃·POCl₃ (I), benzene-treated for many hours with ferrocene as nucleophilic component, yielded the deep violet-red ferrocene aldehyde methylanil ion isolated as the perferrocene alderlyde hierbylaini for isolated as the per-chlorate C₁₁H₁₄FeN-ClO₄ (II) which on hydrolysis gave ferrocenecarboxaldehyde. This with C₆H₅NHCH₃ and ferrocenecarboxaldehyde. This with C_eH₅NHCH₅ and HClO₄ gave a quantitative yield of brownish black needles of II. I and POCl₂ in HCOOH and an O-free atmosphere yielded the deep blue diferrocenylmethylidyne cation, converted by HClO₄ to black needles of diferrocenylmethylidyne perchlorate, C₂₁H₁₉Fe₂ClO₄ (III). Diferrocenylmethylidene salts shaken with aq. Na₂CO₃ in chloroform became bright yellow with formation of diferrocenylcarbinol. The corresponding diferrocenyltrimethylidene perchlorate was similarly prepared. It was significant for clarification of the reaction mechanism of the structure of the cation of III that in all previous Vilsmeier reactions the mere inductive (+I) effect of the nucleophilic component was ineffective and stabilisation of the intermediate by mesomerism was necessary

Synthesis of Thiazole Derivatives. XV-Benzothiazolylpyrazolones V. M. Zubarovskii and G. P. Khodot

Zhur. obshch. khim., 30 (May 1960) 1585-1590 Condensation of benzothiazolylhydrazines with acetoacetic ester leads to formation of benzothiazolylpyrazolones which with 2-(w-acetanilidovinyl)-benzothiazole ethiodide vield dimethinmerocyanines

(R = 2-methylbenzothiazol-6-yl; 2-methylmercaptobenzothiazol-6-yl; 2-methylbenzothiazol-5-yl; or phenyl). These merocyanines are readily decolorised with HCl. On being heated with dimethyl sulphate they form salts which can be used to prepare complex polymethin dyes. Experimental details and analytical results are given. G.J.K.

Leuco-potentials of Sulphur Dyes
T. Urahata, M. Utsunomiya, and H. Hiyama
J. Soc. Textile Cellulose Ind. Japan.

16 (Mar 1960) 220-226

The leuco-potentials of 8 sulphur dyes and the reduction potentials of some reducing agents were determined under various conditions. The reduction power decreased in the order: thiourea dioxide, sodium hydrosulphite, alkalimetal sulphide, but the stability of the last-named was the greatest. The leuco-potentials of sulphur dyes prepared by thionation of indophenols with polysulphides are lower than those obtained by sulphur fusion. used are Asathio Blue (C.I. Sulphur Blue 7), Asathio Indigo, Asathio Yellow (C.I. Sulphur Yellow 4), Asathio Orange (C.I. Sulphur Orange 3), Asathio Yellow Brown (C.I. Sulphur Brown 10), Asathio Black, Asathio Indocarbon, and Asathio Hydron Blue. Diagrams of experimental apparatus are given, and graphs of the relation between pH and the reduction potential of Na₂S and NaHS at 20°, 40° and 60°c. Other graphical data are of the rate of oxidation-reduction of the dyes and reducing

Correlation between Colour Fastness and Structure of Anthraquinone Blue Disperse Dyes

V. S. Salvin and R. A. Walker Text. Research J., 30 (May 1960) 381-388 With a series of arylamino analogues of 1-hydroxy-4arylaminoanthraquinone, 1 - hydroxy - 4 - arylamino - 5 hydroxy-8-nitroanthraquinone and 1-hydroxy-4-arylamino-8-hydroxy-5-nitroanthraquinone there is a direct relation polyester fibres to gas fading (nitrogen dioxides) and O fading (ozone) and as well to the dioxides of the control of the cont O fading (ozone) and as well to the photo-chemical effect of light on the fibres. The degree of fading depends on the nucleophilic characteristics of the arylamino nitrogen. Any structural modification reducing the electron density in this N atom renders it less susceptible to attack by the electrophilic agents responsible for the colour changes and vice versa. Thus an OR substituent (R = H, Alk or hydroxyalkyl) in the benzene ring para to the arylamino N atom yields a dye which fades much quicker than does one having an alkyl or subst. alkyl group in the para position. Similarly, such a substituent in meta position on the benzene ring results in fastness properties superior to those of a dye where the substituent is in the corresponding para position. The active agents in both gas- and O-fading are electrophilic and so most readily attack a strongly nucleophilic centre. An electron-withdrawing group on the benzene ring para to the arylamino N atom gives a dye of higher resistance to gas fading than the corresponding unsubstituted anilino derivative. Introduction of strong electronegative animo derivative. Introduction of strong electronegative groups, e.g. SO₂NH₂, SO₂N(CH₂CH₂OH)₂, COCH₃, CONH₂ and CF₃, reduces the electron density on the arylamino N atom to far below that of the unsubstituted anilho derivative. Such groups tend to withdraw preferentially electrons from the ortho and para positions on the ring and thus greatly decrease the nucleophilic character of the arylamino N atom. All dyes made from such derivatives had excellent resistance to NO2 and O2. C.O.C

Quinonoid Dyes. XIV—Relation between Co-planarity and Substantivity of Quinonoid Dyes applied to Secondary Cellulose Acetate and Cellulosic Fibres

E. H. Daruwalla, S. S. Rao, and B. D. Tilak

J.S.D.C., 76 (July 1960) 418-424

The Effect of Environment and Substituents on the Photochemical Activity of Anthraquinonoid Vat Dyes and the Rôle of $n-\pi^{\circ}$ Transitions

N. K. Bridge J.S.D.C., 76 (Aug 1960) 484-489 Thioindigo IV- Mononitro Substituted Dyes.

Thioindigo

N. S. Dokunikhin and Yu. E. Gerasimenko

Zhur. obshch. khim., 30 (April 1960) 1231-1233 5- and 6-Mononitro derivatives of thioindigo have been prepared through condensation of 3-hydroxythionaphthene with corresponding nitrothionaphthenequinone-2-(p-dimethylamino)-anils and their absorption spectra (visible region) in benzene determined. Their absorption max. are compared with those of thioindigo (C.I. 73330) and dinitrothioindigo. Preparative details are given. G.J.K.

Synthesis Properties of Phthalocyanine

V. F. Borodkin

Zhur. obshch. khim., 30 (May 1960) 1547-1553 Twelve new phthalocyanine analogues containing benzene, or benzene and naphthalene, instead of isoindole rings have been prepared, and their absorption max. (in methanol and chlorobenzene) determined. Substitution of one or two isoindole rings by benzene causes a hypsochromic displacement of the absorption max.; substituents (Cl, CH₂, OCH₃) in the benzene nucleus have only a weak bathochromic effect or none at all. The cpd. dissolve in conc. H₂SO₄, but not in HCl or other dilute mineral acids. Although undergoing a reversible colour change (yellow→ red), attributed to formation of onium salts, they are readily sol. in org. solvents when heated and are stable to alkaline interaction. Those containing a naphthalene ring hydrolyse when heated in dil. mineral acids. Preparative G.J.K. and analytical data are given.

Chemistry of Esters of Leuco Vat Dyes. IV— Oxida-tion with Solutions of Nitrous Acid A. Johnson and A. P. Lockett

J.S.D.C., 76 (July 1960) 412-418

Natural Pigments in Food J. W. Haken

Chem. Weekblad, 55 (1959) 666-673

Chem. Abs., 54 (10 May 1960) 9138 Review of the principal natural pigments that participate in coloration and decolorisation during the processing of food. The problem of the preservation of Chlorophyll (C.I. Natural Green 1) is particularly discussed. 38 C.O.C.

Carbon Black (C.I. Pigment Black 6 and 7) Containing Chlorine or Nitrogen G. B. Bachman and H. I. Berman

Ind. Eng. Chem., 52 (July 1960) 621-624 Various types of Carbon Black have been produced by burning natural gas, methane, ethylene or propane in an atmosphere of oxygen or chlorine or conversely by burning these hydrocarbons when they surround an oxygen or chlorine flame. Carbonaceous matter was collected on glass wool situated above combustion chamber and analysed by combustion. Gaseous products of analysis analysed by combustion. Caseous products of analysis were studied by mass spectrography. Estimated free energy changes show that following reactions are preferred: $CH_4 + O_2 \rightarrow CO_2 + 2H_2$, $\Delta G^\circ = -124$ keal.; $CH_4 + 2Cl_2 \rightarrow CC + 4HCl$, $\Delta G^\circ = -100$ keal., so that carbon black is at best a by-product when hydrocarbons are burned with oxygen. Carbon yield increases with chlorine:hydrocarbon ratio up to a stoichiometric value, being greatest with methane. Product contains < 10% chemically bound chlorine. Addition of ammonia to chlorine-hydrocarbon system where hydrocarbon acts as atmosphere leads to nitrogen-containing carbon blacks. Effects of additions of nitrogen, oxygen, and nitrogen dioxide to this system are described and structures of the chlorocarbons discussed.

Molecular Symmetry of Porphyrins A. N. Sevchenko, G. P. Gurinovich, and K. N. Solov'ev Doklady Akad. Nauk S.S.S.R., 128 (21 Sept 1959) 510-513

Absorption and fluorescence spectra (in castor oil, or glycerine + HCl) of α-, β-, γ-, and δ-tetraphenylporphyrin (I) and its Zn complex (II), dimethylether of mesoporphyrin IX (III) and its Zn complex (IV), dimethylether of protoporphyrin (V), and Chlorophyll-a (VI) have been investigated and the degree of polarisation (P) of the weight distributed the complex (IV) have been investigated and the degree of polarisation (P) of the weight distributed the complex (IV). emitted light determined. Values of the limiting polarisation (P_o) , obtained by extrapolating P for η_{∞} (variation of η with temp.) are related to the symmetry of the porphyrin molecule. It is found that II, III, IV, and V belong to symmetry group D_{th} , the somewhat higher P_{θ} values in the case of III, IV, and V, as compared with II being attributed to the effect of side chains. The much higher P_0 values for I and VI indicate lower symmetry, that of I not exceeding second order.

PATENTS

Continuous Process for Diazotisation

BP 844,062 (Germany 14 Oct 1955) Modifications in the plant described in BP 812,368 (J.S.D.C., 75 (1959) 434) are made, so that amines which diazotise relatively slowly because of their low solubility or coarse grain size can be re-circulated or made to react in a series of vessels arranged in a cascade.

Bis - p - aminophenylbutadienes- Fluorescent Brightening Agents and Intermediates for Azo Dyes USP 2,913,450 (7 Sept 1954) American Cyanamid Co.

Two mol, of p-nitro(or acetamido)benzaldehyde are condensed with 1 mol. of succinic anhydride and the product then reduced (or hydrolysed) to give bis-paminophenylbutadiene (I)-

and starting cpd. containing substituents such as Hal or OAlk give correspondingly substituted derivatives. Disazo direct or azoic dyes derived from these diamines are more deeply coloured than the similar dyes from benzidine or 4,4'-diaminostilbene. Thus I tetrazotised and coupled with R salt gives a greenish-blue direct dye.

Phosphonium Cyclopentadienylides-Azo Coupling Components

American Cyanamid Co. USP 2,914,522 (25 Apr 1957) The title compounds-

R1, R3, R3 = organic radicals in which C is directly linked R', R', R' = organic rangesis in which C is directly finked with P, and are free from basic N atoms and strong acid groups) couple readily with 1 or 2 mol. of diazo compounds to give azo dyes. Thus to a solution in chloroform at -30 to -40° C, of cyclopentadiene is added bromine, air being excluded. Condensation with tribromine, air being excluded. Condensation with triphenylphosphine then gives the product in which $R^1 = R^2 = R^3 = \text{phenyl}$. It couples with diazotised sulphanilic acid to give a monoazo compound which dyes cotton and nylon brown.

Metal-complex Monoazo Wool Dyes Containing Sulphonanilide and Sulphone Groups LRH BP 844,216 (13 May 1957)

Substituted sulphonanilides of o-aminophenol-

$$\begin{array}{c} \text{Alk.80}_2 \times & \begin{array}{c} \text{OH} \\ \text{N.80}_2 \end{array} \end{array}$$

(R = H, CH3, or C3H5; substituents such as Alk and Hal may be present) are diazotised and coupled with suitable o-coupling phenols, naphthols, or keto-enol compounds, and the products alone or with other oo'-dihydroxymonoazo compounds converted into 1:2 metal-complexes with Cr, Co, Fe, or Ni. The products dye wool etc. from neutral or weakly acid baths. Thus 2-aminophenol-4sulphon(m-ethylsulphonyl)anilide is diazotised and coupled with 1-(3',4'-dichlorophenyl)-3-methyl-5-pyrazolone, and the monoazo compound, dissolved in aq. NaOH, is heated with CoCl₂ at 80-85°c. The Co-complex so formed dyes with CoCl₂ at 80–85°c. The Co-complex so formed dyes wool brownish yellow. Four general methods of preparation of the diazo components are outlined.

Orange and Red Monoazo Acid Dyes having Di-sulphimide Groups

Gy BP 840,182 (Switzerland 19 Feb 1957)
The title dyes are obtained by diazotising an amine A·SO₃·NH·SO₃·B·NH₄ (A = a naphthalene or preferably a benzene radical which may contain CH₅ or Cl as a substituent; B = a benzene radical in which NH₄ is ortho to a BP 840,182 (Switzerland 19 Feb 1957) sulphone or sulphonamide group) and coupling under acid conditions with a 2-naphthylamine-

(X = H or OH; Y = SO_3 ·Alk, SO_3 ·OAlk, SO_3 ·O·Ar, or preferably SO_3 ·N(Alk)C₆H₅). Thus 2-amino-4'-methyl-diphenyldisulphimide is diazotised and coupled with a

soln. in glacial acetic acid and ethanol of 2-amino-8naphthol-6-sulphon-N-ethyl-N-phenylamide, giving-

which dyes wool yellowish-red from a bath containing (NH4)2SO4.

Blue Disazo Pigments

8 BP 841,734 (Switzerland 8 Feb 1957) Blue disazo pigments obtained by coupling tetrazotised 3,3 disubstituted benzidines with amides and arylides of 3,2 hydroxynaphthoic acid are improved in covering power by partly replacing these coupling components by 1-aryl-5-pyrazolones. Thus diamisidine (24-4) is tetrazotised and the filtered solution added, with 30% aq. NaOH (45), to a solution of 3-hydroxy-2-naphthoanilidine (47.34) and 3-methyl-1-phenyl-5-pyrazolone (3.48) in water (160) containing methanol (80) and 30% aq. NaOH (24). The blue pigment so formed may be converted into a Cu-complex by heating with aq. CuSO, in presence of diethanolamine E.S.

Blue Metal(Copper)-complex Dis- and Poly-azo Direct Dyes

BP 840,898 (Switzerland 2 Aug 1956) The title dyes are the Cu-complexes of dyes obtained by coupling a tetrazotised benzidine having OH, COOH, or OCH2 groups in its 3,3'-positions with 2 mol. of o-coupling naphtholsulphonic acids of which at least one is an N-substituted 1-amino-8-naphthol-6-sulphonic acid, preferably an N-acyl derivative. Thus tetrazotised o-dianisidine is coupled first with 1 mol. of 1-naphthol-3,8disulphonic acid and then with 1 mol. of N-acetyl-1-amino-8-naphthol-6-sulphonic acid. Heating with aq. ammoniacal CuSO, gives the complex, which dyes cellulose blue of good fastness to crease-resist processing.

Anthraquinone Disperse Dyes S BP 841,927 (Switzerland 18 Apr 1957) Synthetic fibres are coloured fast to light, washing, perspiration, gas-fumes, rubbing and sublimation, by anthraquinone dyes containing up to 4 groups

x-NH-CHB-CHB-COOX

(one B = H, the other H or Alk of > 2 C; X = aralkyl. cycloalkyl, subst. or unsubst. Alk). The dyes are obtained by condensing aminoanthraquinones with alkylene carboxylic acids of $\gg 5$ C atoms and carrying in the α -position a double bond capable of addition, followed by esterifying with the appropriate alcohol to introduce Thus, 1-amino-4-hydroxyanthraquinone is condensed with acrylic acid and the product esterified with methanol to give

a bright violet dye of excellent fastness properties. The process generally results in a marked bathochromic shift from the free amino compounds, but without loss in fastness associated with simple alkylation of the $-NH_2$ group. 98 examples are given. A.T.P. group. 98 examples are given.

Water-soluble Anthraquinone Reactive Dyes BP 843,985 (10 Apr 1958)

Compounds of formula-

 $(X=m\text{-phenylene},Y=Br, or preferably Cl, Q=aryloxy or arylthio; at least one of X, Y, preferably X, contains <math display="inline">\not<1$ SO₃H) are reddish blue dyes of excellent build-up, washing and light fastness, for cellulosic fibres (as BP 798,121, J.s.D.c., 74 (1958) 792), natural protein fibres and some synthetic fibres, e.g. nylon. They are obtained by condensing-

with eyanuric bromide or chiorine and containing $\ll 1$ so hat the final product SO₃H if X is free from SO₃H, so that the final product in the triazine ring. Thus, a contains a halogen atom in the triazine ring. Thus, a bright reddish-blue dye of excellent light and washing fastness for cellulosic fibres is that from 2-phenoxy-4,6dichloro-s-triazine and 1-amino-4-(3'-aminoanilino)anthraquinone-2,4'-disulphonic acid.

Red Pigment of the Perylene Tetracarboxylic Acid Class

BP 840,760 (Germany 24 Oct 1956) FH The title compound is obtained by condensing perylene-3,4.9,10-tetracarboxylic acid or anhydride with 4-aminodiphenyl. It is thus related to and has similar properties and uses as analogous pigments described in BP 835,459; 837,326; and 837,327 (J.S.D.C., **76** (Aug 1960) 514). A.T.P.

Anthradipyridazone Fluorescent Brightening Agents

and Fluorescent Dyes BP 838,994 (5 Dec 1956)

Compounds of formula-

(X and Y = same or different, H or monovalent organic radical) when colourless or slightly coloured are fluorescent brightening agents especially useful with cellulose acetate and synthetic polymers. Those that are strongly coloured are fluorescent dyes. Thus, 2,8-di(2',6''-dimethylphenyl)-anthra-1':9'(N),10'(N):5'-dipyridazone is a good fluorescent brightening agent for polyester fibres. They are made by treating anthraquinone-1,5(or 1,4)-dicarboxylic acid with NH2 NHX in presence of alkali.

Phthalocyanine Dyes and Coupling Components FBy BP 844,419 (Germany 20 Apr 1957)

Phthalocyanine sulphonamides and carbonamides Pc-(R¹-R²)_n (Pc = phthalocyanine radical; R¹ = SO₂ or CO, R² = amino subst. benzene, naphthalene, pyrazolone or acylacetic acid arylamide, linked to R¹ via NH₂ and containing an esterified OH group (I) and ortho to it, a C atom capable of coupling with diazo compounds after saponification of I; n = 1-4), are, after saponification, dyes for cotton and plastics, spinning dopes of synthetic fibres, and coupling components in azo dyes. They are obtained by condensing a subst. or unsubst. metal-free or metal-containing phthalocyanine sulphonic acid or carboxylic acid halide (1-4 acid halide groups) with the requisite primary or secondary amine to introduce R², followed by saponification of I. Thus

$$Ni(Pe)_{s} = \begin{bmatrix} OH \\ C = CH \\ N = C \cdot CH_{a} \end{bmatrix}$$

dyes cotton blue, or may be used in a printing paste with. e.g. the diazoamino compound from 1-amino-2-methyl-4,5-dichlorbenzene and 2-ethylamino-5-sulphobenzoic acid to give a green print on cotton or regenerated cellulose. When coupled with diazotised 2,5-dichloroaniline it yields a green pigment very fast to solvents. A.T.P.

Phthalocyanine Dyes

USP 2,914,537 (24 Jan 1957) General Aniline Bluish green to blue dyes of excellent light and chlorine fastness on cellulosic fibres, are obtained by reaction of I mol. metal phthalocyanine (I) with 0-95-1-10 mol. aryl sulphondihaloamide oxidising agent (e.g. Dichloramine T, $\mathrm{CH_2\cdot C_6H_4\cdot SO_2NCl_2}$), preferably in an organic solvent (630–850 parts/100 I) for 4–48 hr. Unchanged I is filtered off and leuco I precipitated by water. It is yellowish green, greenish brown or brown and is converted to the dye by chemical (reduction) or preferably thermal regeneration. Thus, Cu phthalocyanine (C.I. 74160) (115·2) (IV) is added to Dichloramine T (50·2) in CH₂OH (720). After being stirred 5 hr. at 25°c., the mixture is filtered and the residue washed with CH₃OH (96). The combined filtrates, drowned into H_2O (9800) and neutralised with Na₃CO₄, give the leuco compound (100). It (0·90) is dissolved in Carbitol (62) and aminoethylethanolamine (12·5), 0·5% Keltex Gum soln. (56) and 0·5% Blancol N soln. (37) added, and water added (to bring to 250). Mercerised cotton padded with the above and dried at 90-95°c, for 30 min. is dyed bright blue of excellent fastness.

USP 2,914,538 (25 Jan 1957)

The initial oxidation is carried out with 0.75-1.10 mol. of an N-halogeno amide, e.g. N-bromoacetamide, or an N-halogenoimide, e.g. N-bromosuccinimide, trichloroisoevanuric acid, etc.

Fluorescent Bright Yellow to Reddish Orange Methin Dyes

General Aniline Dyes of formula USP 2,914,551 (5 Sept 1956)

(R1 = Alk, cycloalkyl or Ar; R2 = Alk and, when taken together with R1, part of a heterocycle; R3 = Alk) are intensely fluorescent in daylight as well as in ultraviolet radiation. They are useful for colouring resin coatings and lacquers and in mass coloration of viscose rayon and cellulose acetate. They are prepared by treating a 4-NN-disubstituted aminonaphthaldehyde-1 with a cyanoacetic acid alkyl ester. Thus $p \cdot NN$ -dimethylaminonaphth-aldehyde-1 refluxed for several hours with ethylcyanoacetate in ethanol with piperidine as catalyst yields the reddish orange-

C.O.C.

Antihalation or Filter Dyes

Agfa BP 842,112 (Germany 11 Jan 1956)

Dyes of formula ABC:CH-X'NR'X and ABC:CH-X'NR'X'CH:CAB
(A and B each = CN,COX², CONHR² (X² = Alk, alkoxy,
Ar or subst. Ar; R² = H or Ar or subst. Ar) or together may form a heterocyclic ketomethylene ring or A=H and B= quaternary heterocyclic N base; X^1 and $X^2=$ subst. or unsubst. Ar; $R^1=H$ or subst. or unsubst. Alk)

have very good affinity for gelatin and other film-forming colloids so that when used as photographic antihalation or filter dyes they are non-diffusing and yet are readily bleached out.

Cyanine Dyes containing a 3,6-Diazaindene Ring BP 841,588 (4 July 1957) Ilford

Dyes of formula-

 $(R^1, R^2, R^3 \text{ and } R^6 = Alk; R^3 = Alk, hydroxyalkyl or$ aralkyl; R⁴ = Alk or aralkyl; n and m each = 0 or 1; X = acid radical; Z = CH or N; D² = atoms to complete a 5- or 6-membered ring; D³ = atoms to complete a ketomethylene nucleus), e.g. the yellow (1,1,6-trimethyl-3,6-diazaindene - 2) - (3 - methyl - 2 - benzothiazole)methin cyaninetoluene-p-sulphonate, have photosensitising properties. Methods of making them are described. C.O.C.

Citrus Fluorescent Brightening Agents
Chadeloid Corporation BP 840,887 (14 May 1956)
The title compounds, derived from triazino compounds condensed with citrus flavone glycosides, are of formula-

(R1 = H or OH; R2 = H, OH or OCH2; R3 = OH or X-O; X = sugar residue; $R^4 = H$ or OCH_2 ; Z = COOM or SO_3M ; M = H or a cation) and are obtained by condensing halogenated flavones, e.g. hesperetin, naringenin, criodictyol, or their glycosides with the diaminostilbene sulphonic acids necessary to give the above structure. They are fluorescent brightening agents suitable for use in pastes, paste fillers, wood stains, paper, soaps, synthetic detergents and for natural and synthetic fibres.

Rhodacyanines

Gevaert Photo-Producten

BP 837,674 (Belgium 13 Sept 1955) Modification of BP 646,137 (J.S.D.C., 67 (1951) 89). Dyes of formula-

 \mathbf{D}^{1} R'N(CH:CH),C:CH-CA:C C:CH(CR⁸:CH)_m-C(:CH-CH)_t:NXR⁸

> (D1 and D2 = atoms to complete a heterocyclic nucleus; \mathbf{R}^1 and \mathbf{R}^2 = Alk, aralkyl, Ar or carboxybenzyl; \mathbf{R}^2 = subst. hydroxyl; Z and Y or Y and Z = respectively Sand N-Alk, N-Ar, N-aralkyl or N-alkyl; m, n and t =0 or 1), e.g.-

used in photographic emulsions in presence of blue green diffusion-fast colour couplers result in very bright images in which the whites as well as the colours are perfectly reproduced.

Furnace Black (C.I. Pigment Black 7)

Phillips Petroleum Co. BP 840,504 (U.S.A. 20 Feb 1956) Describes a furnace giving increased yield and a better-C.O.C. quality pigment.

Carbon Black (C.I. Pigment Black 6 and 7) Continental Carbon Co.

BP 839,816 (U.S.A. 23 July 1958) Hydrocarbon gas is decomposed by the tail flame of a hierac (high erosion arc, see USP 2,616,842) having carbon electrodes and the resulting pigment collected. The yield is much higher than that obtained by the channel process.

Carbon Black (C.I. Pigment Black 6 and 7) Dispersions

A. L. Verdier BP 841,881 (France 7 Nov 1955) The pigment as it emerges from the plant is dispersed in a non-aqueous liquid. The process is continuous and the liquid is 25-100 times by wt. of the pigment. The product is used in printing inks, paints, rubber mixes, etc. C.O.C.

Carbon Black (C.I. Pigment Black 6 and 7)

Columbian Carbon Co. BP 839,918 (U.S.A. 12 Feb 1957) High-structure blacks are dry beaded. These beads are then broken up and wet beaded. When they are dried the final beads have hardness and bulk density greater than those obtainable by either dry- or wet-beading alone.

BP 839,919 (U.S.A. 17 Apr 1957) The pigment is allowed to absorb water but not so much is wetted or loses its flocculent powdery condition. It is then beaded by freely tumbling it, e.g. in a drum. The resultant beads have the same surface appearance as dry-process beads but the rate of production is much greater because of the reduction or even elimination of the customary recycling.

Granules of Red Lead (C.I. 77578) and/or Litharge (C.I. 77577)

Accumulatoren Fabrik

BP 841,884 (Germany 19 Dec 1955) Powdered red lead and/or litharge is mixed with 5-15% by weight of a binding agent, e.g. Na or K silicate, or glycerol, while being kept in constant motion until granules are formed. These are then heated to > 300°c., cooled and sifted. cooled and sifted.

Pigment Compositions for the Mass Coloration of Polyesters and Polyamides, Coating Compositions, Moulded and Extruded Products

BP 839,712 (30 Oct 1957) Milling an inorganic or organic pigment or waterinsoluble fluorescent brightening agent with a polyamide in presence of water yields a stable dispersion very useful the mass coloration of polyesters and polyamides. They are also useful in coating compositions, e.g. in casein sizes for paper, and in moulding compositions C.O.C.

Rutile (C.I. Pigment White 6) from Ilmenite Horizons USP 2,914,381 (8 June 1956)

Massive ilmenite ore containing & 5% of its iron content in the ferrous state is crushed to 10-65 mesh (Tyler standard) and then digested with HCl. The gangue materials, i.e. the silica and pyrites, are then separated from the hydrated rutile by either of two methods. In the first method the digested ore is filtered hot, screened and washed in one operation. The solid impurities separated on a 325 mesh screen are washed with warm water or dil. HCl until free from soluble iron. The filtrate and the washing combined are filtered to separate the very finely divided solid material contained in them which is

the desired hydrated rutile. The filtrate consists of a mixture of ferric and ferrous chlorides and HCl, from which the iron and chlorine can be recovered in any suitable manner. In the second method the digested ore is filtered hot to separate all the solids. The filter cake is washed free of soluble iron and then separated by physical methods into two fractions. The fraction coarser than 325 mesh contains the gangue materials and the finer fraction is the desired hydrated rutile. C.O.C.

Oxidative Changes of Compounds with Pyrocatechol Structure (III p. 597)

Sodium Aluminium Silicates as Fillers, Flatting Agents,

Paint Extenders, etc. (III p. 598)
Prevention of Development of Gas in Aluminium (C.I. Pigment Metal 1) Pastes and Paints (V below)

ct Dyeing of Cellulose. VIII—Relation between Dyeing Properties and Double-bond Conjugation (VIII p. 608)

Basic Dyes on Vinylon (VIII p. 608) Light Fastness of Basic Dyes: Constitution and Substrate Dependence (VIII p. 608)
Polymeric Colour Formers (IX p. 610)

Coloured Electrically Conducting Polymers Deeply (XIII p. 614)

Siliceous Pigments for Rubber (XIII p. 614)

Dyes for Plasticised Polyvinyl Chloride, Nit Lacquers and Printing Inks (XIII p. 615)

Paper Chromatography of Textile Dyes (XIV p. 616)
Paper Chromatographic Separation of Direct Cotton and
Acid Wool Dyes (XIV p. 616)
"Soluble Lead" Content of Lead Chromes (XIV p. 616)

V-PAINTS; ENAMELS; INKS

PATENTS

Acrylic Polymers as Coating Agents

Pittsburgh Plate Glass Co

BP 839,840 (U.S.A. 14 May 1956) Polymerising methyl methacrylate with < 10% by weight of another alkyl ester of an ethylenically unsaturated carboxylic acid, e.g. acrylic, methacrylic or itaconic acid, yields copolymers which readily dissolve in commercial solvents to solutions which can be sprayed easily without veiling or webbing, to give films having high gloss and gloss retention, excellent humidity resistance and outdoor durability.

Prevention of Development of Gas in Aluminium (C.I. Pigment Metal 1) Pastes and Paints
English Metal Powder Co. BP 841,597 (10 Jan 1958)

Incorporation of an oxidation-reduction indicator, e.g. diphenylamine, phenol-indo-2,6-dichlorophenol or ethoxychrysoidine, effectively prevents "gassing". 0·2% suffices for pastes made to BS 388:1952.

Pigmented Coating Compositions

BP 841,910 (30 Oct 1957) Compositions containing methyl methacrylate polymers of mol.wt. 55,000-105,000, pigment, volatile solvent and 0·1-10·0% by wt. on total non-volatile components of cellulose nitrate and/or propionate and/or butyrate and/or acetate propionate, are non-flooding and non-mottling, i.e. the dried films they yield show neither myriad tiny spots or streaks of relatively light or dark pigment nor swirls, spots or streaks of aluminium pigment (C.I. Pigment Metal 1) when that is present.

Water Paint

USP 2,914,495 (17 Apr 1956) Monomeric vinyl acetate is mixed with an aqueous starch composition and then polymerised before the starch is gelatinised. The resulting emulsion of polyvinyl acetate and starch is then pigmented.

Silicate Paints

La Ponce Industrielle Française

BP 839,694 (France 22 Mar 1956) Pumice powder (C.I. Pigment White 26) of particle size ⇒ 150 meshes per cm. and another pigment are suspended. in an aqueous solution of an alkali metal silicate in absence of an organic binder. The hard and smooth coatings given by such paints have the great advantage that they are permeable to moisture and so do not tend to disintegrate and scale off. C.O.C.

Aqueous Stoving Varnishes

BP 842,413 (Austria 22 Nov 1955) Vianova Kunstharz A cresol or an aminoplast, an alkyd resin containing a long aliphatic chain and numerous free hydroxy groups and unsaturated C to C linkages, ammonia or a strong water-soluble organic nitrogenous base and water are mixed together. The alkyd resin is oxidised either before or after it is added to the mixture, oxidation being preferably carried out with H2O2.

BP 842,414 (Austria 22 Nov 1955) The products of BP 665,195 (J.S.D.C., 68 (1952) 139) depend for their ability to be diluted with water either upon at least the predominant part of the hardening component being water soluble or upon presence of a substantial proportion of water-miscible organic solvents. These disadvantages are avoided if ordinary resols are replaced by resols containing carboxylic groups.

Multi-layer Pigmented Finishing Systems for Metal

uP BP 842,141 (U.S.A. 14 Nov 1955) Modification of BP 807,913 (J.S.D.C., **75** (1959) 228). The pigment may form > 180% by weight on the filmforming material. C.O.C.

Electrostatic Coating Particularly with Metallic

J. Sedlacsik BP 839,886 (15 Jan 1957) Apparatus having safeguards against leaking of electrical energy from the spray to the supply tank containing the

Applying Coloured Ceramic or Metallic Coatings to Glass Sheets and their Subsequent Tempering Pittsburgh Plate Glass Co.

BP 839,677 (U.S.A. 5 June 1957)

Polymerisation Oven using Propane as Fuel (I p. 596)

Sodium Aluminium Silicates as Fillers, Flatting Agents, Paint Extenders, etc. (III p. 598)

Pigment Compositions for the Mass Coloration of Polyesters and Polyamides, Coating Compositions, Moulded and Extruded Products (IV p. 604)

Copy-making Paper Stationery Sheets (XI p. 613)

Polymers of Unsaturated Carbamato Ethers and Thioethers (XIII p. 615)

Cross-linked Copolymeric Polyesters for Surface Coatings and Films (XIII p. 615)

Rheological Measurement of Free-flowing Materials (XIV p. 615)

VI-FIBRES; YARNS; FABRICS

Crystalline Modifications of Cellulose

IV— Determination of X-ray Intensity Data J. Mann, L. Roldan-Gonzalez, and H. J. Wellard J. Polymer Sci., 42 (Jan 1960) 165-171

Describes determination of intensities of X-ray reflections from the ordered regions of cellulose I (ramie) and cellulose II (Fortisan), which, in a later paper, will be compared with postulated structures.

V- Crystallographic Study of Ordered Molecular Arrangements

D. W. Jones Ibid., 173-188 VI-Unit Cell and Molecular Symmetry of Cellulose I

D. G. Fisher and J. Mann Ibid., 189-194 Attempts to fit X-ray and electron diffraction data to P.T.S. theoretical structures.

Heterogeneous Hydrolysis of Native Cellulose
R. Bode, F. Rochon, and H. Ruck
J. Polymer Sci., 41 (Dec 1959) 543-544
A low-angle X-ray investigation into cellulose micellar

Apparent Activation Energy of Hydrolysis of Some Cellulosic Materials M. L. Nelson J. Polymer Sci., 43 (Apr 1960) 351-371 Chemical Modification of Wool by Trichloroacryloyl-

diazomethane
A Kling Melliand Textilber., 41 (Feb 1960) 220-226 The synthesis of trichloroacryloyldiazomethane $(CCl_1 = CCICOCHN_2)$ and its reaction with wool and reduced wool under mild conditions are described. The products exhibit yellow discoloration and harsh handle. Supercontraction and alkali solubility tend to be reduced, whereas tear strength is often increased. The results are accounted for by postulating reaction with -SH groups in the keratin molecule and steric hindrance produced by the bulky substituent thus introduced. Paper chromatography fails to verify this, however, presumably owing to the lability to acid hydrolysis of the β-ketothioether linkage formed. 8.M.J.

Alkali Solubility of Wool as Function of Fibre Fineness

G. Wibaux, G. Mazingue, and M. Van Overbèke

Bull. Inst. Text. France (87) (Mar-Apr 1960) 61-64 Tests on 31 samples of top show that a highly significant inverse correlation exists between alkali solubility and fibre diameter. It is not yet known whether this is attributable to lanthionine formation during scouring, or to increasing cuticle thickness with increasing fibre

Relation between Number of Lanthionine Cross-links and the Urea-Bisulphite Solubility of Alkali-treated Wool

B. W. Jones and P. T. Speakman

J. Applied Polymer Sci., 3 (Jan-Feb 1960) 43-46 It is possible to apply quantitatively the theory of the relation between the degree of cross-linking and solubility worked out for synthetic polymers irradiated by highenergy radiation to the case of wool which has been crosslinked by an alkali treatment and which is therefore less soluble than untreated wool in standard urea-bisulphite solution at 65°c. in 1 hr.

Effect of Sorption Process on Dynamic Rigidity Modulus of Wool Fibre

B. H. Mackay and J. G. Downes J. Applied Polymer Sci., 2 (July-Aug 1959) 32-38 The dynamic rigidity modulus of wool fibre has been measured with a torsion pendulum while water vapour has been sorbed and desorbed. Low values of the modulus are observed during water sorption and desorption which cannot be reconciled with the equilibrium moduli unless transient stresses occurring during sorption and desorption temporarily lower the modulus.

Influence of Surfactants on Fibre Properties

K. Fujii, T. Kamijo, and A. Nakatsugawa J. Soc. Textile Cellulone Ind. Japan

16 (Jan 1960) 31–41 Such properties as elongation, strength, D.F.E. and dyeability are studied. 14 Non-ionic and anionic compounds are used, and cross-sections of dyed wool treated with these are given in detail. A wide variation is observed in the effects of the surfactants on properties. By using an effective surfactant, it is possible to prevent damage to wool during dry-heating.

Sorption of Water by Dry Keratin Fibres in Atmospheres above 90% R.H. M. Feughelman

J. Applied Polymer Sci., 2 (Sept-Oct 1959) 189-191 Keratin consists of a water-impenetrable phase embedded in a water-permeable matrix. When moisture uptake by the matrix is complete, the matrix undergoes a sol-gel transformation. Torsional rigidity and longitudinal stress at low strain are compatible with this model.

Chemical Attack of Textile Fibres. II- Protein **Fibres**

O. Howitt (B) Silk Fibroin

J. Textile Inst., 51 (May 1960) P 238-P 248

(C) Regenerated Proteins

Ibid., (July 1960) P 321-P 325 Continuation of the explanatory article previously noted (J.S.D.C., 76 (June 1960) 380).

Stiffness of Silk Fibres. V—Influence of Hygroscopicity of Surface-active Agents H. Takagi J. Soc. Textile Cellulose Ind. Japan,

16 (Mar 1960) 186-189

The adsorption of non-ionic surfactants (polyethyleneglycol octylphenol ethers) gradually decreases as the degree of polymerisation and the hygroscopicity are increased. The adsorption of cationic surfactants having a high hygroscopicity is large, but gives a fibre of low hygroscopicity and decreased rigidity. The surfactant molecules, as well as the humidity, appear to have a softening action on raw silk.

Viscose Rayon Stabilised by Heat Treatment

K. Kanamara and K. Koyano

J. Applied Polymer Sci., 3 (Mar-Apr 1960) 143-152 The rayon is swollen with very dilute acetic acid and heat treated at 60-70°c. These conditions give the most marked change in mechanical properties. Infrared, X-ray, and deuteration methods show that treatment causes a 3% increase in crystallinity. P.T.S.

Rôle of Additives during Regeneration of Cellulose from Viscose Solutions

M. Levine and R. H. Burroughs

J. Applied Polymer Sci., 2 (Sept-Oct 1959) 192-197 The influence of caustic soda, zinc, and by-product sulphur on the degree of swelling and rate of neutralisation of viscose are reported. Additives dealt with practically include a polyethylene oxide derivative and an amine, and their effects are examined theoretically.

Dynamic Mechanical Properties of some Polyamides A. E. Woodward, J. M. Crissman, and J. A. Sauer J. Polymer Sci., 44 (May 1960) 23–34

The damping, resonant frequencies, and dynamic elastic storage moduli of five polyamides have been investigated at resonant frequencies from 100 to 2000 cycles/sec. at temperatures from 100° to 450°k. Specimens of polyhexamethylene adipamide containing different amounts of water were used, as were other polyamides.

Dynamic Mechanical Properties of Nylon

T. Kawaguchi

J. Applied Polymer Sci., 2 (July-Aug 1959) 56-61 An attempt is made to relate mechanical loss data at different temperatures to chemical structure using 18 nylons and three similar compounds. The vibrating-reed technique is used to obtain the results which are in line with an earlier theory that the β dispersion at -40°c. is due to segmental motion involving non-hydrogen-bonded amide groups. Dispersion at other temperatures is also discussed.

Sorption of Water by Nylons

H. W. Starkweather
J. Applied Polymer Sci., 2 (Sept-Oct 1959) 129-133 The sorption isotherms at 23°c. of films of nylon 6.6 and nylon 6.10 annealed to give a relatively high, constant level of crystallinity are concave upwards over the entire range of humidity, suggesting that all the amide groups are hydrogen bonded to other amide groups. The partial specific volume of water is 0.46 c.c./g. at 0% R.H. and 1.0 c.c./g. at 100% R.H. Intermediate values fit a Flory-Huggins equation. Theoretically deduced heats of corption of water on nylon 6.6 are compared with experimental values.

Molecular-weight Distribution of Nylon 6.6

G. J. Howard J. Polymer Sci., 39 (Sept 1959) 548-549 Molecular-weight distribution of nylon is shown to follow the equation of Flory, and is not a Gaussian or Poisson distribution. This seems to be so whether or not chain-interchange reactions take place.

Proton Magnetic Resonance of Polyhexamethylene Adipamide

R. E. Glick, R. P. Gupta, J. A. Sauer, and A. E. Woodward J. Polymer Sci., 42 (Jan 1960) 271-273

Orientation in Fibre Formation from Polymer

I— Preliminary Investigations on Polycaproamide A. Ziabicki and K. Kedzierska J. Applied Polymer Sci., 2 (July-Aug 1959) 14-23 There are two possible mechanisms of fibre orientation during melt spinning: a process analogous to cold drawing in the solidified regions of the polymer, or a process analogous to flow orientation in the liquid polymer.

alternative.

II- Theoretical Considerations

A. Ziabicki Ibid., 24-31 The theoretical differences between streaming orientation and orientation during melt spinning have been examined, and the coefficients of orientation of fibres consisting of rigid particles and flexible, coiled chains have been defined. P.T.S.

Physical Structure and Dyeability of Nylon 6. I-Effect of Tension and Heat Setting

M. Tsuruta, A. Koshimo, and T. Maehara

J. Soc. Textile Cellulose Ind. Japan, 16 (Mar 1960) 215-219 Molecular orientation of nylon 6 filaments, stressrelaxed under various tensions or heat-treated after stress relaxation, are determined from X-ray diffraction, birefringence and dye dichroism measurements. Molecular orientation increases with increasing tension, particularly on dry heat-setting after stress relaxation. Heat-setting, but not tension, affects the specific gravity. However, tensions, particularly below 0.5 g./den., affect the dye-ability of the heat-set fibres and this effect is enhanced by dyes of high molecular weight.

Introduction of Chelate Bonds into Fibres

X-Effect of Cr on Strength and Dyeing of Polyester Fibre

N. Hōjō and N. Minemura

J. Soc. Textile Cellulose Ind. Japan, 16 (Mar 1960) 177-198 Introduction of Cr into Tetron fibres reduced fibre strength by 3% and elongation by 14%. The amount of dye absorbed was proportional to [Cr] on fibre. Thus dyeing properties are improved without much detriment to physical properties.

XI-Determination of Distribution of Cr in Polvester Fibre

N. Hōjō and N. Minemura Ibid., 16 (Apr 1960) 296-298 Polyester fibre (Tetron) is treated in aq. K₂Cr₂O₇ (15 g./l.) and H₂SO₄ (245 g./l.) for 5 hr. at 120 c. and then Samples (0.5 g.) of the Cr-treated Tetron are heated in 10% aq. NaOH for varying times, rinsed and dyed with Sunchromine Pure Blue B Extra (C.I. Mordant Blue 1). Dye absorption and weight loss are determined. The latter increases with time of alkali treatment and is 40% after 45 min. As the dye adsorption increases, the weight loss decreases to a critical value A, where a break in the curve occurs. This is due to Cr on the fibre. From the weight loss at A, the distance which the Cr has penetrated is calculated.

XII- Influence of Metal Chelate Bond with Cystine

on Properties of Wool N. Hōjō and T. Miyazaki The cystine disulphide bonds in degreased Merino wool are broken by immersion of wool in 0.05 M-thioglycollic acid (liquor ratio 100:1) for 4 hr. at 20°c. and then washing with water. 8 is chelated to Cu by treating 15 g. of unreduced wool in a mixture of 50 ml. of 0.05 m-Cu(NO3), 20 ml. of 0.5 N-HNO3, 50 ml. of 2 M-KNO3, 50 ml. of 30 soln, of a non-ionic surface-active agent, and 200 ml. of water, at 30°C. for 67 hr., washed and dried. The Cu forms a metallic salt with 8 when the reduced fibres are similarly treated (recombined). After 5-hr. treatment in 0-1 N-NaOH at 65°c, the weight loss of Cu-treated wool uri N-Naum at 00°C, the weight loss of Cu-treated wool increases to 26% (from 11% after 1 hr.), whereas with recombined wool it is less than 25% after 5 hr. and 14% after 1 hr. (in comparison with 36% for untreated wool after 5 hr. and 12% after 1 hr.). The loss in S content after allight treatment is 150% in whereast. after alkali treatment is 15% in untreated wool, 6% in chelated wool, and 5% in recombined wool. L.P. chelated wool, and 5% in recombined wool.

X-ray Diffraction Studies of Crystallinity in Polyethylene Terephthalate

J. Applied Polymer Sci., 2 (Sept-Oct 1959) 205-209

Effect of Heat Treatment on γ-Ray-irradiated Polyvinyl Chloride Fibres (II)

T. Aramaki, H. Hayanami, and M. Takayanagi

J. Soc. Textile Cellulose Ind. Japan. 16 (Mar 1960) 203-208

The fibres are heat treated at constant length at various temperatures from 100 to 200°c. Treatment above 140° C. is possible only for fibres irradiated $> 3 \times 10^{8}$ r. because of cross-linking of the long chains. X-ray studies show that both crystallinity and degree of orientation of the irradiated fibres are decreased by this method. However, the heat resistance is improved, e.g. thermal shrinkage of fibres irradiated at $1.5 \times 10^7 \, \mathrm{r.}$ is less than 15% at 200%. This figure is higher than that of commercial polyethylene terephthalate fibres. The breaking strength and Young's modulus at room temperature are decreased by this treatment but the ultimate elongation is increased. The mechanical properties are still within the range of practical use. The mechanism of cross-linking by heat treatment is examined quantitatively by means of infrared spectra, determination of unsaturation by catalytic hydrogenation and by degree of swelling in the nitrobenzene.

PATENT

Oriented Thermoplastic Filaments having a Satiny Appearance
Dow Chemical Co.

BP 841,599 (27 Jan 1958)

Dow Chemical Co. BP 841,599 (27 Jan 1958) Addition to a normally crystalline vinylidene chloride copolymer of 0·05–0·30% by wt. of an alkali metal salt of a Cl or Br oxy acid and 0·05–0·30% of a P oxy acid results in filaments melt spun from the copolymer and then stretched having a satiny appearance or lustre. The filaments are opaque but have the strength and flexibility of filaments produced in absence of these additions.

C.O.C.

Pigment Compositions for the Mass Coloration of Polyesters and Polyamides, Coating Compositions, Moulded and Extruded Products (IV p. 604)

Sorption of Iodine and the Linkage between Dyes and Cellulose (VIII p. 608)

Dyeing Polyacrylonitrile Fibres- I (VIII p. 608)

Chemical Reactions of Thioglycollic Acid in the "Si-Ro-Set" Process (X p. 610)

Cystine in Wool. IV—Setting with Mercapto-Acid (X p. 610)

Properties of Silicone-resin-treated Silk Fabrics (X p. 611) Irradiation with β-rays of Spun-viscose Fabrics Impregnated for Resin Finish (X p. 611)

Infrared Spectra of Crystalline Polysaccharides (XI p. 612)

Sorption and Desorption Kinetics of Water in Regenerated Cellulose (XI p. 613)

Crystalline Morphology of Polyaerylonitrile (XIII p. 614) Surface Tension of Viscous Polymers at High Temperatures (XIII p. 614)

Spectra of Irradiated Polyamides (XIII p. 614)

Infrared Spectra and Crystal Structures of Polyamides (XIII p. 614)

Degradation of Polyethylene Terephthalate in Nitrobenzene at 170°c. (XIII p. 614)

Polymers of Unsaturated Carbamato Ethers and Thioethers (XIII p. 615)

Sulphurous Acid or Alkali Metal Sulphites as Stabilising Agents for Polymeric N-Vinyl Pyrrolidones (XIII p. 615)

VII – DESIZING; SCOURING; CARBONISING; BLEACHING

Scouring of Acrylic Resin Sizes Labelled with Radioactive Carbon

H. Moroff and R. Kretz

Melliand Textilber., 41 (July 1960) 848-850
The removal by washing from rayon fabric of the cured water-soluble acrylic resin size Rohatex has been studied by introducing radioactive ¹⁴C into the carboxyl group of the size. After curing, the resin content of the fabric was 4.5%. The size was removed by washing with water at 20°C. After two washes of only 45 sec. duration, practically all the size was removed.

M.T.

Theory and Practice of Sodium Chlorite Bleaching J. K. Skelly J.S.D.C., 76 (Aug 1960) 469-479 Development and Research (1945-1960) in Raw Wool Scouring, Carbonising, Backwashing, and Yarn Setting

M. Van Overbèke

Bull. Inst. Text. France (87) (Mar-Apr 1960) 35-59

LBS—Process for Simultaneous Dry-cleaning and Disinfection of Woollen Hospital Blankets H. Ostertag Melliand Textilber., 41 (June 1960) 763-768

Ordinary washing methods using water are unsuitable for woollen blankets because of fibre damage. Drycleaning with trichloroethylene or perchloroethylene has a disinfectant effect only in the presence of a sufficiently high amount of water. This water content, however, not only unduly prolongs the drying time but can cause felting and shrinking. Addition of high-molecular-weight nitrogen-containing cpd. sol. in trichloroethylene and, still better, sol. in perchloroethylene gives the desired bactericidal effect. A detailed description of testing of disinfectant effect is given.

W.M.

PATENTS

Anhydrous Silicon Tetrachloride or Boron Trichloride as Carbonising Agent

chloride as Carbonising Agent Zschimmer & Schwarz Chemische Fabrik und Gerbstoffwerk Oberlahnstein BP 835,634 (Germany 11 Oct 1956)

Anhydrous silicon tetrachloride and boron trichloride are excellent agents for dry carbonising and have the advantage of removing cellulose acetate. They can be used as gases but are preferably used in solution, e.g. in trichloroethylene. The treated wool is neutral and as it does not have to be washed can immediately be further processed.

C.O.C.

Bleaching Keratinous Fibres

Harris Research Laboratories *USP* 2,914,374 (24 Mar 1954)

The fibres are first treated at 150-212°F, with an aqueous solution containing free formaldehyde and a ferrous salt and then with hydrogen peroxide at pH 7-9 and 120-195°r, preferably in presence of a stabiliser. Presence of a reducing agent for keratin in the first bath keeps the bath stable and the iron in the ferrous state and gives better chemical stabilisation of the keratin and a better bleach. Inclusion of a sequestering agent for iron in the first bath enables higher pH to be used and improves the bleach. Thus dark Aleppo carpet wool (250 lb.) was treated in a bath (1900 litres) containing FeSO₄·7H₂O (3·5·lb.), citric acid (1·1), Na sulphoxylateformaldehyde (0·35), Triton X·100 (0·9) and 40% formalin (11·1 litres) at 180°F. for 90 min. while bringing the pH to 5.5-6.0 with acetic acid. It was then rinsed twice at 110°r, for 3 min, and then bleached with oxalic acid (16-8 lb.), anhydrous tetrasodium pyrophosphate (42), Na₂CO₃ (29-4) and 120 vol. H₂O₃ (16-6 gal.). After 1 hr., Na₂CO₃ (2 lb.) was added to maintain the pH at about 8-2. Total bleaching time was 3-5 hr. during which the temperature rose from 130 to 140°F. After rinsing a cream-coloured wool was obtained. The alkali solubility was unchanged and the breaking strength only slightly reduced.

Removing Residual Soap and Detergent from Laundered Goods

L. Ogren BP 839,772 (8 Mar 1957)
The goods while in a rotating centrifuge are treated ovenly with water from above and, preferably simultaneously, with water issuing horizontally from the centre. The amount of water issuing from the jets balances that removed by centrifuging; thus no rinsing water accumulates in the drum or circulates in the goods.

Improving the Water-binding Power of Drycleaning Solvents

FH BP 842,266 (Germany 17 Feb 1950) The power to bind water of dry-cleaning solvents is increased while maintaining their filterability by adding to them a sulphonate of a chloroparaffin wax or oil containing > 14 C and 10-40% Cl. C.O.C.

Steaming Processes in Preparation and Bleaching (I p. 596) Bleaching Cellulose Pulp (XI p. 613)

Bleaching Paper Webs with Hydrogen Peroxide (XI p. 613)

VIII-DYEING

Dyeing Education in Glasgow. From Anderson's University (1796) to the Royal College of Science and Technology (1958)

R. A. Peel

J.S.D.C., 76 (Aug 1960) 490-495

Relation of Apparent Diffusion Coefficient to Time of Half-dyeing W. F. Kilby J.S.D.C., 76 (Aug 1960) 479-484

Reactive Dyes on Cellulose

T. Urahata, O. Manabe, and H. Hiyama J. Soc. Textile Cellulose Ind. Japan, 16 (Mar 1960) 227-234

Diact Colour C dyes, derived by introducing -CON2 groups, have affinities of -1.9 to -4.1 kcal./mole for cotton and -1.6 to -3.3 kcal, mole for viscose rayon. The affinity is less in alkaline solution, but is increased in acid solution. Absorption spectra show that \(\lambda_{\text{max}}\) of dye decomposed in acid solution is shifted to longer wave-The first-order reaction is slow in acid solution but quick in alkaline solution, and the rate increases with temperature. At 30°c., with 5 g./l. NaCl, the diffusion coefficients are 0.13-0.21 cm2/day. Rate of batchwise dyeing and fastness of dyeings are comparable to those of cold-dyeing Procion dyes, but the colour is changed appreciably by severe washing with Na₂CO₃. Absorption spectra and thermodynamic data are given.

Direct Dyeing of Cellulose. VIII- Relation between Dyeing Properties and Double-bond Conjugation K. Nishida J. Soc. Textile Cellulose Ind. Japan,

15 (Oct 1959) 837-841 Rates of diffusion and adsorption isotherms of (I) triazole derivative of Congo Red (C.I. 22120) (II) Sirius Supra Brown 3RL (C.I. 35760), (III) Diazo Indigo Blue 2RL (C.I. 34010), and (IV) Sirius Supra Brown RL (C.I. 34035) are determined in presence and absence of salt. Mean values for the standard affinities from baths containing 0.05–1.0 mole NaCl/kg. of dyeing liquor are (I) 5.6, (II) 6.2, (III) 5.1 and (IV) 4.5 kcal./mole. I and II do not contain conjugated chains, which could promote coplanarity of the aromatic nuclei, whereas III and IV do. The usual explanation for the affinity of direct dyes on cellulose does not seem to apply to these dyes.

Sorption of Iodine and the Linkage between Dyes and

K. Schwertassek

Faserforsch, und Textiltech., 11 (Apr 1960) 159-164 Cellulose dyed with substantive or reactive dyes absorbs less iodine than undyed cellulose. No such effect could be observed with cellulose dyed with vat dyes. The conclusion is drawn that OH groups which are responsible for the uptake of iodine react chemically (reactive dyes) or are blocked by absorption (direct dyes), while vat dyes are not W.M. at all, or only very slightly, bound to the fibre.

Dyeing Polyacrylonitrile Fibres-I

A. A. Geller and A. B. Pakshver

Khim. Volokna (6) (1959) 15-17 Chem. Abs., 54 (25 May 1960) 10330

During formation, stretching, finishing and drying of the fibre its structure tightens considerably and the coefficient of diffusion of dye inside the fibre decreases sharply. Decrease in the velocity of absorption of dyes during plastic stretching of the fibre is accompanied by simultaneous increase in the amount of sorbed dye at equilibrium. Possibly stretching, finishing and dyeing decrease the dimensions of internal holes and canals in the fibre. Stretching also leads to formation of new holes and increases the internal active surface of the fibre.

Dyeing Polyacrylonitrile

Takase

III- Redox Potential for the Cuprous Ion Method

J. Soc. Textile Cellulose Ind. Japan. 16 (Apr 1960) 315-319

Hydroxylamine sulphate is the best reducing agent for obtaining deep, level shades. The most effective p.d. is 207 ± 10 mv. Fibre reflectance values show it is better and more economical to apply the reducing agent in stages.

Thus, for 5% CuSO₄ on the weight of fibre, 1.5% hydroxylamine sulphate is added, followed 15 min. later by a further 1% and 30 min. later by 0.5%. The optimum pH is 3.

IV-High-temperature Dyeing

At 105°c, the dyeing time is 0.5-0.7 that at 100°c, and O2-0-25 that at 95°C. A diagram of the apparatus used is given, together with absorption spectra of the dyes used: Rocelline (C.I. Acid Red 88, levelling dye), Neutral Cyanine Green BN (C.I. 61570, semi-milling dye), and Coomassie Brilliant Blue G (C.I. Acid Blue 90, milling dye). dye). The relation between equilibrium exhaustion and temperature is similar for all three, unlike on wool. Calculated activation energies are approx. 20-27 kcal./mole.

Carrier Action in Dyeing Polyester Fibres

E. Elod Melliand Textilber., 41 (Feb 1960) 195-199 Spectrophotometry of dye soln, with and without carriers shows little difference: dye-carrier complex formation is therefore unlikely. Polyester fibres pretreated with carriers and exhaustively extracted with acetone still show higher subsequent dye uptake. High carrier conen. in presence of dye 'sinter' outer zone of polyester fibre and can render it impermeable to dye. Carriers increase extension of polyester fibres for a given load. It is concluded that their mode of action depends on a loosening of the micro-structure of the polyester fibre. S.M.I.

Basic Dyes on Vinylon
A. Katayama, N. Kuroki, and K. Konishi

J. Soc. Textile Cellulose Ind. Japan,

16 (Apr 1960) 324-329

Absorption isotherms at 80°c. of C.I. Basic Blues 9 and 26, C.I. Basic Violets 3 and 10, C.I. Basic Red 2, and C.I. Basic Orange 2 are determined in the presence and absence of salt. The isotherms are represented by

$$[D]_f = \frac{K[S] \ [D]_{\theta}}{1 + K[D]_{\theta}} + \ K[D]_{\theta}$$

The first term corresponds to adsorption of dye cations by carboxyl anions and the second to solution of the dye in the fibre. Values for K, K' and S are given. L.P.

Dyeing of Vinylon

Tanabe and A Nasuno

I- Direct Dyes

J. Soc. Textile Cellulose Ind. Japan, 16 (Mar 1960) 235-241

Various Vinylon fibres, e.g. wet-spun and heat-treated; wet-spun (heat-treated) and formalised; dry-spun (heattreated) and formalised; are dyed with Congo Red (C.I. Direct Red 28) and the dyeings compared with those on cotton and viscose rayon. The λ_{max} of these dyeings are similar and lie between 610 and 630 m μ . The depth and colour on cellulose depend only on the amount of dye absorbed. On Vinylon, dyeing conditions are also important; the longer the dyeing time and the greater the temperature, the deeper and brighter the shade. Dyeings on dry-spun Vinylon can thus be made equivalent to those on viscose rayon. Shades are paler and duller on wet-spun Vinylon, probably because of the porous structure of the core.

II- Disperse Dyes

Ibid., 241-245

The above Vinylon fibres are dyed with Diacelliton Fast Brilliant Blue (C.I. Disperse Blue 3) and the dyeings compared with those on secondary cellulose acetate. λ_{max} are between 470 and 477 m μ . In all cases, the $\lambda_{\rm max.}$ are between 470 and 477 m μ . In all cases, the colour and depth depend on the amount of the adsorbed dye but are independent of dyeing conditions. on wet-spun Vinylon again show inferior properties.

L.P. Light Fastness of Basic Dyes: Constitution and Substrate Dependence

D. Bitzer and H. J. Brielmaier

Melliand Textilber., 41 (Jan 1960) 62-64 Increasing basicity of cationic dyes is associated with decreasing light fastness on acrylics, probably because of preponderantly hetero-polar rather than semi-polar dye-fibre bonds. Modification of cotton by carboxylation, cyanoethylation and butane sultone treatment raises light fastness of cationic dyes developed for acrylics, but not that

of the classical cationic dyes, relative to the value on tannintreated cotton, although the fastness levels on acrylics are Saponified cyanoethylated cotton and not achieved carboxymethylated cotton, on the other hand, yield higher light fastness with the classical, but not with the newer, cationic dyes. The higher moisture content of cotton relative to acrylics also leads to lower light fastness. Measurements of extinction of Astrazone Yellow 5G (C.I. Basic Yellow 12) and other dyes in various solvents (C.I. Basic Yellow 12) and other dyes in various solvents show very rapid fading in 30% acetic acid and very high stability to light in 30% benzenesulphonic acid and, most markedly, in acetonitrile. Addition of ultraviolet (UV) absorbers such as 2,4-dihydroxybenzophenone to the solutions improves light fastness slightly with many cationic dyes, but very considerably with some dyes, e.g. Astrazone Red 6B (C.I. Basic Violet 7) and Malachite Green (C.I. Basic Green 4), whose UV absorption spectra overlap those of the UV absorber. In other cases dye-absorber interaction takes place. This is similar to the phenomenon of fluorescence-quenching. Adding quenchers like resorcinol or phloroglucinol to their solutions increases light fastness enormously for fluorescent cationic dyes such as Rhodamine B and for non-fluorescent triphenylmethane and Astrazone dyes, particularly yellows, reds, and violets, but leads to pronounced shade changes with blues and greens, probably due to redox reactions.

S.M.J.

Development of Standfast Patent Continuous Molten-metal Vat-dyeing Processes A. Ogden

Amer. Dyestuff Rep., 49 (27 June 1960) 466-471 A review of present-day practice. C.O.C.

PATENTS

Developing Diazotisable Direct Dyes on the Fibre Whiffen & Sons BP 835,628 (6 Sept 1957)

The dye is applied, diazotised and then treated with a developer in presence of an alkali metal chloride or sulphate. Thus cotton cloth dyed with Chlorazol Diazo Green BDS (C.I. Direct Green 47) is diazotised and then treated with an aqueous solution of 5-naphthol (C.I. Developer 5) containing NaCl (10-25g./litre). The resultant dyeing has good fastness to light and washing. C.O.C.

Azoic Dyeing of Animal Fibres

FH BP 841,260 (Germany 12 July 1955)
The goods are treated in a bath of high liquor ratio containing an azoic coupling component and a diazo- or tetrazo-amino compound containing no solubilising groups. The colour is then developed in an acid bath and the dyeings finished in the usual manner. Thus natural silk is treated in a bath containing 1-(2',3'-hydroxynaphthoylamino)-2-methyl-4-chlorobenzene and the diazo amino compound obtained from diazotised 1-amino-2-methyl-4-chlorobenzene and diethanolamine. The bath contains solvents, alkali and a dispersing agent. After being rinsed in water containing a little NaOH and NaCl the silk is treated with acetic acid, when a bluish red dyeing results.

Dyeings of Extremely Good Fastness to Wet Treatments on Protein or Artificial Fibres by Use of Dyes containing a Reactive Amino Group

ICI

A dye containing a reactive amino group, e.g.

Naphthalene Dark Green A (C.I. 29495) treated with
cyanuric chloride at 20°c. in aqueous medium, is applied
in an aqueous solution containing a water-soluble heterocyclic compound containing at least one -N:C(Hal)- group
in the ring, e.g. Na-(2'A'-dichloro-s-triazinylamino)naphthalene-6-sulphonate. This gives improvement in
wet-fastness properties and eliminates the toxic hazard
present when water-insoluble heterocyclic compounds
containing the above group in the ring are used after being
dissolved in an organic solvent and then emulsified in

Patterned Colour Effects on Polyester Textiles

Bradford Dyers Association BP 841,226 (30 Oct 1957) A textile made wholly or largely from a polyester fibre is subjected to mechanical pressure and then dyed in presence of an auxiliary agent which causes the polyester to take dyes up more easily. Alternatively the textile may be dyed first, then subjected to mechanical pressure and finally treated with the auxiliary agent. Thus heat-set Terylene taffeta is hot embossed and then dyed with C.I. Disperse

Violet 8 using benzyl alcohol as the dyeing assistant. It is then rinsed and scaped in presence of Uvitex ER (Ciba). This results in well-defined bright violet stripes on a nearly colourless unglazed ground. C.O.C.

Dyeing Polyesters or Cellulose Triacetate

FBy BP 841,169 (Germany 24 Jan 1957)
The aryl esters of carbonic acid used as assistants in disperse dyebaths result in much deeper dyeings having in most cases improved fastness to light. Thus Terylene is dyed for 2 hr. at 98°c. in an aqueous bath, liquor ratio 40:1, containing the disperse dye 1-hydroxy-4(p-tolyl)-aminoanthraquinone (0.75 g./l.), diphenyl carbonate (4) and Na dinaphthylmethane disulphonate (2). This yields a deep blue dyeing of very good fastness to light.

Applying Fluorescent Brightening Agents to Cellulose Ester, Nylon, Polyester and Polyacrylonitrile Fibres and their Blends with Other Fibres

Ciba BP 835,719 (Switzerland 20 Dec 1955)
The fibres are treated with an aqueous preparation containing a fluorescent brightening agent which has no brightening effect on the fibre when applied by the "exhaust" process and an artificial resin. Thus polyester fibre fabric is padded with its own weight of a liquor containing water (900), fluorescent brightening agent (0.6) of formula—

condensate of 8 mol. ethylene and 1 mol. p-tertiary octyl phenol (1-2), condensate of 2 mol. HCHO and 1 mol. of the reaction product of 1 mol. ethylenediamine hydrochloride and 2 mol. dicyandiamide (100) and $(NH_4)_8SO_4$ (5), and dried for 30 min. at 85°C. A good brightening effect is obtained. Numerous examples of suitable combinations of fluorescent brightening agents and resins are given. C.O.C.

Dyeing Polyacrylonitrile Fibres with Basic Dyes ICI BP 841,020 (2 May 1958)

Level dyeing is obtained in an aqueous bath by having present a weak organic acid and a mixture of a non-ionic surfactant, or cationic surfactant and an anionic surfactant, the two latter being present in such proportions that their solubilising groups are present in equal amounts. Thus C.I. Basic Blue 5 is readily dyed level on polyacrylonitrile fibres by use of a mixture of dimethylphenylbenzylammonium chloride (4), mixed oleyl and cetyl sodium sulphates (6) and cetyl alcohol-ethylene oxide condensate (1:17 mol.) (10) in an acetic acid dyebath.

Improving the Fastness to Washing of Polyacrylonitrile Fibres Dyed with Anionic Dyes ICI BP 835,649 (21 Feb 1958)

Treatment with a hot acid aqueous solution of a tanning agent is used. Thus polyacrylonitrile fibre dyed with 8% of C.I. Acid Green 35 is treated in a bath containing 85% HCHO (4 parts), water (4000) and a sulphonated sulphurised phenol (1). This yields a heavy green dyeing of good fastness to washing.

Level Dyeing of Polyamide Fibres having Irregular Affinity for Dyes

BP 835,722 (Switzerland 30 Nov 1956)
Polyamide fibres of irregular affinity for dyes are dyed level if there is present in the dyebath a sulphonated unsatd. fatty acid of 16–20 C or its ester. Thus barré-dyeing nylon cloth is readily dyed level with Xylene Fast Red P (C.I. Acid Red 118) from a formic acid bath containing 1·5 parts per 4000 liquor of oleic acid 99% sulphonated from which the unsulphonated oleic acid has been removed by an organic solvent. C.O.C.

Dye Liquor for Dip Staining of Plasticised Polyvinyl Acetal Sheeting

Pittsburgh Plate Glass Co. USP 2,914,373 (30 Jan 1956)
Unsulphonated pyrazolone azo dyes insoluble in water
but soluble in organic solvents, e.g. alcohols, ketones,
esters, oils and plastics, are excellent yellow components
for the above dye liquors. The preferred yellow dye is

4 - phenyl - azo - 1 - phenyl - 3 - methyl - 5 - hydroxy - pyrazol (C.I. 12700), and aqueous Cellosolve (23–27% by vol. water) the preferred solvent. C.O.C.

Open-width Dyeing and Finishing of Fabrics of Cellulosic, Man-made or Blended Fibres (I p. 596)

Oxidative Changes of Compounds with Pyrocatechol Structure (III p. 597)

Correlation between Colour Fastness and Structure of Anthraquinone Blue Disperse Dyes (IV p. 600)

Physical Structure and Dyeability of Nylon 6. I—Effect of Tension and Heat Setting (VI p. 606)

IX-PRINTING

The English Contribution to the Development of Copper-plate Printing
P. C. Floud
J.S.D.C., 76 (July 1960) 425-434

Printing of Fabrics of Polyester Fibres and of Unions Containing this Fibre. II—Printing of Unions and Discharge-printing

B. Hantsch Melliand Textilber., 41 (May 1960) 580-586 Preparation of cotton-polyester fibre mixtures is discussed and 2 methods of printing described. (1) Printing with suitable vat dyes whereby fixation on the polyester fibre is carried out by the Thermosol process and fixation on cotton by the 2-phase process, (2) printing with a mixture of disperse and reactive dyes. A third method using mixtures of disperse and leuco-vat dyes is mainly of theoretical interest. Details of method 1 and 2 together with the preparation of printing pastes is given. The printing of wool-polyester fibre mixtures is then considered and 3 methods are described: (1) combination of disperse and wool dyes, (2) disperse and reactive dyes, (3) selected vat dyes. Lists of suitable dyes in each class are given together with recipes. Steaming and after-treat-ment are discussed. White and illuminated discharges are then dealt with after briefly mentioning the pad-steam process. The dyeing of dischargeable ground colours is described in some detail. Two processes can be used for white and illuminated discharges on polyester fibre fabrics, namely the Thermosol process or the usual steaming process. In both cases Decrolin (C.I. Reducing Agent 4) is recommended as reducing agent. When steaming is applied higher pressures are required. Swelling agents (Turnescal) facilitate penetration of the reducing agent. Colour discharge is then considered and 2 lists of vat dyes suitable for the steaming and the Thermosol proposes representation of the steaming and the Thermosol process respectively are given.

PATENTS

Colour-corrected Colour Separation Records from Multi-colour Images Agfa BP 837,317 (Germany 19 Jan 1956)

Corrected Colour Separations

Miehle-Goss-Dexter BP 840,407 (U.S.A. 26 Feb 1957) A wholly optical method and apparatus for making high-fidelity colour separations. It is based on correction of the light energies in accordance with predetermined factors, having positive and negative signs, based on the reflectance, absorbance characteristics of the pigments and substrate to be used in making the reproduction.

Polymeric Colour Formers

ICT BP 839,896 (23 Oct 1957)
The condensate of a colour former carrying an amino group with a styrene-maleic anhydride copolymer is an excellent non-diffusing colour former for use in photographic emulsions.

C.O.C.

Developing Latent Electrostatic Images

Lumoprint Zindler BP 839,397 (Germany 29 June 1956)
A latent electro-static image on a photoconductive layer having a backing is passed downward into and upwardly out of a developer powder consisting of toner or pigment particles borne on a carrier, e.g. glass spheres. The assembly is then shaken free of surplus pigment and passed to a device which fuses the retained pigment.

C.O.C.

Diazotype Printing Apparatus (I p. 597) Rhodacyanines (IV p. 603) Copy-making Paper Stationery Sheets (XI p. 613)

X-SIZING AND FINISHING

Flame-resistant Finishing of Cellulose Textiles. III—Reaction of Mixtures of Chloromethylphosphonic acid and Urea with Cellulose B. Schiffner and G. Lange

Faserforsch. und Textiltech., 11 (June 1960) 276-283
When cellulose is heated for 20 min. at 150°c. with a mixture of chloromethylphosphonic acid (1 mol.) and urea (4.5 mol.) there result the ammonium salts of the chloromethyl- and aminomethyl-phosphonic esters of the cellulose in approximate molecular ratio 40:60.

C.O.C.

Alkylation of Cellulose and its Importance in Textile Finishing

U. Einsele Melliand Textilber., 41 (June 1960) 721–729
Eight different methods of etherification of cellulose are discussed in detail. The finishing effects that can be obtained by introduction of various groups are considered. Not all the methods of alkylation which would be possible from the chemical point of view are suitable for textile material; the methods actually in practical use are mentioned.

W.M.

Shrink-proofing of Wool with Neutral Permanganate or Acid Bromate in Concentrated Sodium Chloride Solution

J. R. McPhee Text. Research J., 30 (May 1960) 358-365. Treatment with neutral permanganate (4-6% KMnO₁ on wt. of wool) in conc. aq. NaCl at 20-40°c, for 1-2 hr. gives better colour and less damage than treatment in absence of NaCl. Subsequent reducing treatment is necessary only to remove the MnO₂ and plays no part in the reduction of felting power. Similar use of acid bromate (1-2% K bromate on wt. of wool) in conc. aq. NaCl results in chlorination, which is more easily controlled to give even treatment than simple acid chlorination, while its effect on handle, rate of dyeing, and fastness to washing of dyeings is similar to that of simple acid chlorination.

Chemical Reactions of Thioglycollic Acid in the "Si-Ro-Set" Process

H. Gerthsen and H. Zahn Melliand Textilber., 41 (June 1960) 757-763
This process for the production of permanent creases in 100% wool fabrics consists in the following steps: creasing, spraying with 2% aqueous ammonium thioglycollate, steaming, ironing, and drying. Wool treated by this process contains 2-amino-2-earboxyethyl carboxymethyl disulphide chemically combined with the fibre, thioglycollic acid and dithioglycollic acid, the last two being easily washed out with water.

Permanent Deformation of Wool by "Si-Ro-Set" Processing H. E. Schiecke

Melliand Textilber., 41 (Feb 1960) 209-215
Practical problems are discussed, such as choice of materials of construction to avoid coloured and corrosion offects, colour changes of dyes, critical importance of moisture content, failures caused by reducing this or pH. measures for removing the set, and causes and cure of odour formation. Finally, mechanistic theories are reviewed and analytical methods for thioglycollate, such

as colour formation with nitroprusside, are outlined.
S.M.J.

Cystine in Wool. IV— Setting with Mercapto-Acid
Y. Nakamura and Y. Nemoto

J. Soc. Textile Cellulose Ind. Japan, 15 (Sept 1959) 759-766

Worsted fabrics are set in mercapto-acid solution. At lower temperatures than those usually used for crabbing, treatment with thioglycollic acid (TGA) is effective in setting wool at concentrations of about 10 mg. equiv./100 g. wool. Under severe conditions, the handle is unchanged but the ahrinkability increases. This can be reduced by rinsing and treating with H₂O₂. More TGA is necessary to give the same alkali solubility in acid solution

as is obtained by setting in alkaline solution. The addition of anions decreases the absorption but has little effect in alkaline solution. H2O2 is more effective for wool reduced in alkaline solution, whereas rinsing is more effective for acid-reduced wool.

Supercontracting and Setting Behaviour of Modified Wool Fibres

A. R. Haly and M. Feughelman

Text. Research J., 30 (May 1960) 365-372 Ultraviolet irradiation of wool increases the rates of supercontraction in unbuffered aq. LiBr and of setting in boiling water. A second, slower effect is progressive reduction in degree of contraction at equilibrium. Treatment with thioglycollic or peracetic acid also increases the rates of supercontraction and setting, whereas co-ordination or treatment with Van Slyke reagent decreases them. There is little or no loss of tyrosine and little loss of cystine during the irradiation time giving the maximum effect on rate of supercontraction. Rate of supercontraction, rate of setting, and second-order transition temperature are closely related, as are equilibrium contraction, maximum set, and permanent stress. 34 references.

Properties of Silicone-resin-treated Silk Fabrics E. Omura and A. Hirata

J. Soc. Textile Cellulose Ind. Japan,

16 (Mar 1960) 209-214 "Habutae" fabric and silk bolting cloth are treated with an organosilicon resin and tested for resin adsorption, transmission degree of humidity, air permeability, water-proofness, and crease recovery. Less resin adheres to 'Habutae'' fabrics woven from raw silk filaments of high size deviation than to those of low deviation. The amount depends on the denseness of the fabric but usually increases with the number of treatments. The resin gives a higher transmission degree of humidity, smaller air permeability, greater water-proofness, and better crease recovery.

Resin Finishing of Cellulose

Yokovama

IV-Reaction of Urea-Formaldehyde Precondensates in Finishing Bath during Predrying

J. Soc. Textile Cellulose Ind. Japan, 16 (Jan 1960) 42-47

Changes in pH and relative viscosity (η_{τ}) of the finishing bath at 75°c. are measured. Both are affected by catalysts in the first two hours. Thus, although Catalyst AC has little effect, Catanitto, NH₄Cl and DAP decrease pH and increase η_r until precipitation occurs and the bath becomes turbid. If the precondensates are methylated, the stability of the bath is improved. A non-linear relation between pH and η_T is found. The rates of HCHO production (F%) and methylene linkage formation (M%) are estimated for a finishing bath containing methylated dimethylolurea. When Catanitto, NH,Cl or DAP is used, M reaches 70%, whilst F is less than 25%.

V-Effect of Pick-up

Addition of solids to the bath and the percentage pickup have little influence on the composition of the bathliquor just after squeezing. The resin distribution after curing is affected by pick-up below a certain value, resin migration becoming less vigorous. It appears necessary to obtain exact squeeze-roller clearance to obtain uniform results.

Crease-resist Treatment by Urea-Formaldehyde Resin. XIII—Dimethylol Ethylene Urea M. Hida, S. Niino, and Y. Konno

J. Soc. Textile Cellulose Ind. Japan,

16 (Apr 1960) 334-338

Physical properties of resin-treated viscose rayon, such as crease-recovery, imbibition value and elastic recovery, and effect of repeated soaping on these, are studied in order to determine the mechanism of the finish with Sumitex resin 901 (Dimethylol ethylene urea). physical properties are intermediate between those obtained with HCHO and those with dimethylol urea. The N content and crease recovery of the fabrics are reduced by short soaping, but elastic recovery and imbibition values are hardly changed. However, prolonged soaping has little effect. It is concluded that cross-linking in the cellulose occurs and resin is formed within the fibre.

Testing in the Laboratory of Chemically Aftertreated Polycaprolactam Staple Fibres

E. Fritzsche and A. Wicklein Faserforsch, und Textiltech., 11 (Apr 1960) 180–189 A number of chemicals were tried and it was found that appreciable raising, crimping, stiffening and delustring effects can be obtained only if the conditions of after-treatment are so severe that fibre damage becomes unavoidable.

Finishing with Epoxy Resins
K. Lindner Melliand Textilber., 41 (Jan 1960) 82-85
The author reviews the chemistry of epichlorohydrin, and poly-epoxy derivatives and of resinification on textiles, describes numerous patent specifications, discusses the effectiveness not only of the efficient, but toxic zinc tetrafluoborate, but also of a range of acids, and summarises properties such as wash- and chlorine-resistance on cotton and shrink-resistance and water repellency on wool, particularly in conjunction with polyamide resins. A test for epoxy resins is quoted: 2 ml. of a neutral 30% soln. of resin in methylglycol are mixed with a few drops of phenolphthalein and with 2 ml. of lithium chloride soln. (10 parts anhydrous LiCl, 5 parts water and 85 parts methylglycol) and boiled for 10 sec., when a red colour is formed, on account of the formation of lithium hydroxide according to-

$$-R-CH-CH_2 + LiCl + H_2O \rightarrow -R-CH-CH_2 + LiOH$$
OH Cl

8.M.J.

Baking of Resin Finishes—II S. Iwasaki, H. Furusawa, and I. Fujita

J. Soc. Textile Cellulose Ind. Japan, 15 (Sept 1959) 754-758

The baking of resin on (a) clean glass plates and (b) cotton is studied. The results can be fitted to the equation-

$$\ln\!\left(\frac{r}{r-x}\right) = k(z-z_0)$$

where r is the unchanged part of the resin (water-soluble at 70°c.) when t = 0, (r - x) is the unchanged portion when t = z, k is the velocity constant of the reaction, z is the baking time and z_0 the waiting time. In all cases, k can be fitted to the Arrhenius equation $\ln k = \ln A + (-E/RT)$. For series (a), E=8.82 kcal./mole and $A=2.178\times 10^4$ min. $^{-1}$; for series (b), E=18.85 kcal./mole and A=1.012 \times 10^9 min. $^{-1}$. Cumulative baking at various temperatures is also examined and found to be expressed by the equation-

$$\ln\left(\frac{r}{r-x}\right) = \int_{z_0}^{z} k dt$$

It is concluded, from the differences in reaction velocities, that in (a) reaction between resin components only occurs, whereas in (b) reaction between resin and cellulose pre-

Resin-finishing by A. Soc. Textile Cellulose Ind. Japan J. Soc. Textile Cellulose Ind. Japan (Apr. 1980) 330-33.

16 (Apr 1960) 330-333

Previously determined optimum conditions for the polymerisation of CH₄CHCOOH (part III), using Na₂S₂O₃/H₂O₃ as redox catalyst, are tested on viscose rayon staple. Yields of 70% are obtained using similar rayon staple. Yields of 70% are obtained using similar amounts of $Na_2S_2O_3$. If the latter is substantially reduced, the yield of polymer is low.

Irradiation with β-rays of Spun-viscose Fabrics Impregnated for Resin Finish W. Albrecht and E. Völpel

Melliand Textilber., 41 (June 1960) 741-745 Material impregnated with precondensates was exposed to \$-rays. Samples with and without catalyst and and without softeners were tested. It was found that relatively low intensities of radiation cause serious fibre damage. The effect of irradiation with β -rays on the resin condensation is too small to be of interest for finishing

Fur Fabrics

Collins & Aikman Corpn.

BP 842,470 (U.S.A. 4 Sept 1956) Yarns containing several plies of yarn of substantially different degrees of shrinkability are woven as the pile of a The pile is then cut, the pile yarns open and the fabric. The pile is then cut, the pile yarms open and the more highly shrinkable yarms shrink. This forms two separate pile surfaces, the shrunk yarms simulating the furry undercoat of natural furs and the remaining yarms simulating the beard hairs.

C.O.C. simulating the beard hairs.

Reproduction Tracing Cloth Winterbottom Book Cloth Co. BP 841,515 (21 Mar 1955) A thin cloth is impregnated and coated with a polyester composition. To the face of the cloth there is then applied a thin preformed self-sustaining film of an acetone-soluble cellulose acetate of combined acetic acid content 52.0-59.5% cellulose acetopropionate or cellulose aceto-butyrate. The assembly is then cured. The product is readily marked with ink or pencil and is readily receptive of a light-sensitive coating.

Heat-resistant Bonded Fibre Fabrics

BP 842,496 (U.S.A. 25 Jan 1957) A non-woven dense fibrous web consisting wholly or to a substantial extent of polytetrafluoroethylene fibres can be uniformly impregnated by dipping it into an aqueous dispersion of a fluorinated ethylene polymer. To prevent air being trapped in the interstices of the web it has first deposited in it a water-soluble wetting agent, e.g. octylphenyl polyglycol ether, 0.5-2.0% on the weight of the web giving the best results, and the web is immersed in the aqueous dispersion at such a rate that the level of the aqueous dispersion in the web is maintained the same as that outside it. Finally the fluorinated ethylene polymer is coagulated in the web, volatile substances are removed and the fluorinated ethylene polymer is at least partially coalesced, preferably by heat.

Hot Pressing of Cloth D. C. Finlay-Maxwell

BP 841,171 (7 Jan 1958) The cloth is "papered up" in the usual manner with press boards having electrical heating elements embedded in them. Each board is separately connected to the supply of current. They are then placed in the press and pressure is applied. The current for the boards is automatically controlled. In the first stage there is an initial warm-up period during which the cloth close to the heating elements is quickly heated to a maximum safe temperature. In the second stage current is supplied intermittently to maintain such temperature within close limits, while in the third and final stage the current is switched off while the pressure is maintained for a further period. C.O.C.

Pile Fabric

BP 837,366 (U.S.A. 25 June 1957) Midland Silicones Pile fabric is produced by (1) treating a flat tricot knit fabric with a liquid silicone, (2) raising the fabric, (3) passing the fabric near to an electrostatic bar to cause the raised fibres to stand out, (4) again raising to develop the desired pile, and (5) finishing in the normal manner for C.O.C.

Sizing and Finishing Glass Fibre Textiles

Owens-Corning Fiberglas Corpn.

BP 838,019 (26 Sept 1956) Modification of BP 813,602 (J.S.D.C., 75 (1959) 439), improved results being obtained if the reaction between the hydroxy resinous and the quaternary ammonium compounds is effected in presence of a Werner complex in which a trivalent Cr atom is co-ordinated with an acyclic carboxylic acido group of > 8 C. C.O.C.

Polymerisation Oven using Propane as Fuel (I p. 596) Water-soluble Latent Catalysts for Curing Resin Finishes (III p. 598)

Modified Polyacetals as Textile Finishes (III p. 598)

Water-repellent Finish (III p. 598)

Furan Derivatives as Rodent Repellents (III p. 598)

Stiffness of Silk Fibres. V- Influence of Hygroscopicity of Surface-active Agents (VI p. 606)

Introduction of Chelate Bonds into Fibres (VI p. 606)

Effect of Heat Treatment on γ-Ray-irradiated Polyvinyl Chloride Fibres (II) (VI p. 606)

Patterned Colour Effects on Polyester Textiles (VIII p. 609) Softener Absorption by Regenerated Cellulose (XI below)

Coating Moving Web with Liquids (XI p. 613)

Polymers of Unsaturated Carbamato Ethers and Thioethers (XIII p. 615)

XI— PAPER AND OTHER CELLULOSIC PRODUCTS

Infrared Spectra of Crystalline Polysaccharides

II— Native Celluloses in the Region 640-1700 cm⁻¹
C. Y. Liang and R. H. Marchessault

J. Polymer Sci., 39 (Sept 1959) 269-278 A contribution to the interpretation and band assignment of the cellulose infrared spectrum, using spectra from highly crystalline and well-oriented cellulose crystal-An attempt is made to correlate band polarisations with the authors' previously published modification of the cellulose I lattice. Deuterated specimens and tilting effects contribute to the evidence.

III- Mercerised Cellulose

R. H. Marchessault and C. Y. Liang

J. Polymer Sci., 43 (Mar 1960) 71-84
The polarised spectrum of doubly oriented cellulose II
has been observed, and an attempt is made to correlate the observed absorption bands in the extended regions with the crystalline structure. C4 hydroxyl groups do not appear to be engaged in intra-molecular hydrogen bonding.

IV- The Use of Inclined Incidence in the Study of Oriented Films

Ibid., 85-100

Only qualitative interpretations are usually possible of observations using tilted specimens, but these are discussed.

V — Chitin

F. G. Pearson, R. H. Marchessault, and C. Y. Liang *Ibid.*, 101–116 P.T.S.

Grafting on to Cellulose and Cellulose Derivatives using Ultraviolet Radiation N. Gescintov, V. Stannett, E. W. Abrahamson, and

J. J. Hermans

J. Applied Polymer Sci., 3 (Jan-Feb 1960) 54-60 Anthraquinone-2,7-disulphonic acid, in the presence of ultraviolet radiation, abstracts a hydrogen atom from cellulose and cellulose derivatives, and if this is carried out in the presence of a monomer, graft copolymerisation will take place. Acrylonitrile in dimethylformamide, acrylamide in water, and styrene/acrylonitrile in dimethylformamide have been used. A three-fold increase in weight can occur.

Attack by Moths of Cellulose, Films and Bags of "Moth-proof" Plastics H. Reumuth and Th. Loske

Melliand Textilber., 41 (July 1960) 871-873 Contrary to general belief, not only fibres but even films of cellulose or cuprammonium rayon are attacked by moth larvae. Recently it was found that bags made of polyethylene are also attacked. The fact that a material cannot be digested by moths does not protect it against attack, as the larvae bite their way through it in order to attack, as the investigation of the investigation o polyethylene bag).

Softener Absorption by Regenerated Cellulose R. Mykolajewycz, E. Wellisch, R. N. Lewis, and O. J. Sweeting

Applied Polymer Sci., 2 (Sept-Oct 1959) 238-240
Regenerated cellulose is put into aqueous solutions of glycerol containing 3.8-95% glycerol, and the results confirm earlier experiments, that there is no preferential absorption of glycerol by the regenerated cellulose—the absorbed solution has almost the same composition as the surrounding solution. In fact, the enrichment factor varies only between 0.96 and 1.03. P.T.S.

C.O.C.

Sorption and Desorption Kinetics of Water in Regenerated Cellulose

J. Polymer Sci., 41 (Dec 1959) 425-434 A. C. Newns Water sorption into cellulose is accompanied by slow changes in the polymer structure. A study of the kinetics of sorption and desorption for various parts of the of sorption and description to the processes and the water-cellulose interaction. Changes in the viscoelastic properties are also mentioned. P.T.S. viscoelastic properties are also mentioned.

Mechanical Anisotropy in Drawn Films of Regenerated Cellulose N. Wilson J. Polymer Sci., 43 (Mar 1960) 257-266

PATENTS

Bleaching Cellulose Pulp

R. L. McEwen, C. W. Raleigh, and C. E. Price USP 2,912,297 (2 Dec 1954)

A water-soluble salt of a reducing oxy acid of sulphur, e.g. sodium dithionate (hydrosulphite), in an amount of 0.1-10% on dry pulp basis, is incorporated in the pulp (consistency 20-60%) which is rapidly heated to evaporate moisture until the consistency is 95%. The method may be used for freshly formed paper on the machine.

Cellulose Fibrous Sheet

USP 2,910,399 (9 Apr 1956) Rohm and Haas Co. Excess soln. is removed from an aq. dispersion of cellulose fibres containing < 10% by wt. of alum. The fibres are rapidly rinsed with water and redispersed to form a suspension containing 0.1-6% by wt. of fibres on the wt. of water into which is mixed an aq. dispersion of a waterinsol. addition polymer containing 1-150% by wt. of polymer based on the wt. of fibres. After deposition of the polymer on the fibres, the sheet is formed in the

Giving Paper a Shiny Aluminium Surface

National Research Corpn. and Consolidated Paper Bag Co. USP 2,897,095 (1 Mar 1955)

The paper is given two thin coatings of water glass (11b./1000 sq.ft. each), being baked at $<170^{\circ}\mathrm{r}.$ after each coating. It is then treated with Al vapour in vacuo to yield a shiny finely adherent film of the metal on the paper.

Drum-finished Coated Paper
USP 2,919,205 (18 Sept 1956) The coating contains a compound in which the metal ion is present in an inhibited phase but can be released in situ to react with and gel the adhesive also present. While still wet, the coating is treated to release the metal ion, causing a layer of the coating to gel, and the coated web is passed between a pair of rolls, one being heated and having a forming surface, so that moisture is driven into the web without disrupting the smoothness of the surface.

High-gloss Cast Coated Paper J. W. Smith BP 838,180 (U.S.A. 25 Mar 1957)

The web is uniformly coated with an aq. pigment adhesive suspension containing 45-65% total solids (10-20%) adhesives). The coating is coagulated after application to the web, but before contact with the casting surface by wrapping the coated paper, coated side out, tightly round a roll dipping into a coagulating soln. containing a Ca, Zn, Ba, Pb, or Al salt of formic, acetic, citric, tartaric, lactic, hydrochloric, or sulphuric acid. This prevents distortion. The web is then transferred by press roll to a heated, silicone-covered casting roll.

Bleaching Paper Webs with Hydrogen Peroxide DuP USP 2,893,819 (8 Aug 1955)

An aq. alkaline liquid and hydrogen peroxide are applied separately to the moving paper web. The treated web is dried by bringing it into contact with one or more rotating heated rollers while pressing it against the heated surface by means of a taut polyethylene terephthalate drier felt.

Decorative Felted Fibrous Sheet

Armstrong Cork Co. USP 2,905,583 (2 May 1955) A tacky synthetic rubber is added to the fibrous slurry in sufficient amount to coat the fibres which then form clumps. A second similar suspension of fibres, coloured differently from the first, is added and sheets are formed from the mixture.

Paper Resistant to Water and Mildew

to water, aqueous liquids and mildew.

M. de Domenico and G.-V. R. de Domenico BP 841,256 (18 May 1956) Treating the pulp or paper with an N-hydroxy- and/or N-alkoxy-methylated polyurea imparts excellent resistance

Backing Paper for Pressure-sensitive Tapes Johnson and Johnson USP 2,905,584 (25 May 1955) Wet tensile strength and abrasion resistance are improved by adding an elastomeric polymer to the beater mixture. After precipitation of the polymer on the papermaking fibres, the sheet is formed on a conventional paper machine. R.A.

Inorganic Papers

USP 2,901,390 (19 Dec 1955) General Aniline Sheet-like products having the advantages of the inorganic constituents and the strength and flexibility of organic papers are obtained by incorporating into an aq-dispersion of the siliceous stock 0·1-5% of a water-soluble polymer containing > 20% N-vinyl-2-pyrrolidone and an insolubiliser for the polymer. The sheets can be made on normal papermaking machines.

Paper from Polyester Fibres DuP · USP 2,905,585 (30 Apr 1954) A paper-like mass of self-bonded, molecularly orientated fibres is produced by adding a dil. aq. soln. of thiceyanate to a suspension of polyester fibres and pressing the matted structure while heating to remove solvent.

Controlling the Moisture Content of a Travelling Web of Paper, Pulp or Board P. Lippke BP 844,386 (Germany 26 Jan 1956)

The moisture content is sensed periodically across the web by means of a movable moisture meter which automatically regulates a stuff inlet slit and a moistening device in such a manner that the amount of stuff passing through the slit and the amount of water applied locally to the web vary over the width of the web according to the sensed moisture content of the area. R.A.

Copy-making Paper Stationery Sheets Kalamazoo BP 839,141 (21 Nov 1957) A sheet which, when written on, transfers an impression to a sheet placed beneath it has its underside coated with a mixture of Spirit Blue Base (cf. C.I. 42775) and wax emulsified in a water-soluble, film-forming substance.

Coating Moving Web with Liquids

BP 841,268 (28 May 1956) Very uniform thickness of coating irrespective of variations in the thickness of the web is obtained if the web is coated with the liquid from a reservoir and then directly led through a short gap or tunnel filled with the directly led thought a sale to the last a pressure gradient in the direction of travel of the base so that the pressure at the exit is greater than that at the entry. This gap or tunnel is formed between the web suitably supported on a first surface so as to follow a constant track and a second surface whose generatrix is parallel with the first surface.

Crystalline Modifications of Cellulose (VI p. 605)

Heterogeneous Hydrolysis of Native Cellulose (VI p. 605)

Apparent Activation Energy of Hydrolysis of Some Cellulosic Materials (VI p. 605)

Rôle of Additives during Regeneration of Cellulose from Viscose Solutions (VI p. 606)

Sorption of Iodine and the Linkage between Dyes and Cellulose (VIII p. 608)

XII-LEATHER; FURS; OTHER PROTEIN MATERIALS

Oxidative Changes of Compounds with Pyrocatechol Structure (III p. 597) Fur Fabrics (X p. 612)

XIII— RUBBER; RESINS; PLASTICS

Crystalline Morphology of Polyacrylonitrile V. F. Holland J. Polymer Sci., 43 (Apr 1960) 572-574 Five electronmicrographs. P.T.S.

Surface Tension of Viscous Polymers at High

Temperatures F. J. Hybart and T. R. White

J. Applied Polymer Sci., 3 (Jan-Feb 1960) 118-121 Bubble pressure determination of the surface tension of nylon 6.6 at 285°c, shows that even at this temperature association between polyamide molecules persists

Spectra of Irradiated Polyamides

J. Applied Polymer Sci., 2 (Sept-Oct 1959) 181-185 Infrared Spectra and Crystal Structures of Polyamides

A. Miyake J. Polymer Sci., 44 (May 1960) 223–232
The amide group frequencies of 24 nylons indicate that, irrespective of the length of the methylene chain between the amide groups, they are virtually completely hydrogen bonded. A band at 725 cm⁻¹ can be used as an indication of the number of methylene groups between amide groups.

Microstructure of Cold Fracture Sections as an Indication of Changes in Properties of Injectionmoulded Nylon Polymers

E. G. Bobalek, J. Lacson, and W. R. Dawson J. Applied Polymer Sci., 3 (Jan-Feb 1960) 113-117 Steaming or heat-ageing of nylons 6, 6.6 or 6.10 causes changes in the mechanical properties, but does not appear to alter the crystalline: amorphous ratio. Examination of fracture surfaces shows that alteration of microstructure takes place during heat treatments. 12 Electron-P.T.S. micrographs.

Degradation of Polyethylene Terephthalate in Nitrobenzene at 170°C.

N. G. Gaylord and S. Rosenbaum

J. Applied Polymer Sci., 2 (July-Aug 1959) 124 The chain-breaking reaction appears to be first order, with a rate constant $k=0.49\times 10^{-7}\,\mathrm{sec^{-1}}$. P.T.S.

Thermal Degradation and Oxidation of Polymers by Infrared Spectroscopy. I-Experimental Technique and Butylated Melamine Formaldehyde and Urea Formaldehyde

J. H. Lady, R. E. Adams, and I. Kesse

J. Applied Polymer Sci., 3 (Jan-Feb 1960) 65-70

Interfacial Polymerisation

E. L. Wittbecker and P. W. Morgan J. Polymer Sci., 40 (Nov 1959) 289–297

II-Fundamentals of Polymer Formation at Liquid Interfaces P. W. Morgan and S. L. Kwolek Ibid., 299-327

III—Polyamides
R. G. Beaman, P. W. Morgan, C. R. Kroller, E. L.
Wittbecker, and E. E. Magat

Ibid., 329-33

Ibid., 329-336 IV-Polyphthalamides

M. Katz Ibid., 337-342 Short-chain

V—Polyterephthalamides from Short-ch Aliphatic, Primary, and Secondary Diamines V. E. Shashoua and W. M. Eareckson Ibid., 343 Ibid., 343-358 VI-Polyamides based on 4,4-Sulphonyldibenzoic

Acid C. W. Stephens Ibid., 359-366

VII-Polyurethanes E. L. Wittbecker and M. Katz Ibid., 367-375

VIII—Polyurethanes and Polyamides with both Functional Groups in a Single Molecule J. R. Schaefgen, F. H. Koontz, and R. F. Teitz

Ibid., 377-387 IX-Polysulphonamides

S. A. Sundet, W. A. Murphey, and S. B. Speck Ibid., 389-397

X-Polyphenyl Esters Ibid., 399-406 W. M. Eareckson

XI- Ordered Copolymers D. J. Lyman and S. L. Jung Ibid., 407-418 Details are given of a new method of producing highmolecular-weight polymers under very mild conditions (room temperature, dilute monomer solutions) at solution interfaces, one phase containing, say, a diamine, and the other a dicarboxylic acid chloride. By continuously removing the skin of polymer at the interface, the polymerisation can be made to continue until the monomers

Electrical Properties of Epoxy Resins during Polymerisation

J. Delmonte

J. Applied Polymer Sci., 2 (July-Aug 1959) 108-113

Deeply Coloured Electrically Conducting Polymers . French, L. Roubinek and A. Wassermann

Proc. Chem. Soc. (July 1960) 248-250 3-(Cyclopenta-2,4-dienyl)cyclopentanol, its trichloroacetic acid ester, eyelopentenyl chloride, cyclopentadienylidenecyclopentane, and a colourless cyclopentadiene polymer (prepared from cyclopentadiene and stannic chloride) are converted, by catalysis with trichloroacetic acid, into deeply coloured polymers, the electronic spectra of which are characterised by peaks at 250-254 mu. $(\log_{10}\epsilon, 4.08-5.00)$ and $310-365 \text{ m}\mu$. $(\log_{10}\epsilon, 3.70-4.78)$, the deep colour being due to tail ends of the latter peaks. All the polymers are proton-acceptors, and their electronic spectra indicate the presence of conjugated double bonds. The rate of polymerisation is not affected by addition of the product, peroxides, oxygen, or traces of water, but large quantities of water or other proton-acceptors (ethanol acetone, dioxan) act as retarders. A reaction scheme is included which accounts not only for the structural aspects, but also for the stoichiometry and kinetics of polymerisation.

Co-ordination Polymers

C. N. Kenney
Chem. and Ind. (No. 28) (9 July 1960) 880–884 Preparative methods for co-ordination polymers are discussed. Three methods are given for linking poly-ligands by metal ions: addition of an alkaline solution of a bis-β-diketone to a solution of the ion; precipitation from a solution of the ketone, a metal salt and urea; melt polymerisation. Molecular weights of polymers obtained by these methods are usually low, but brittle fibres of beryllium-containing polymers have been obtained. Attempts have been made to prepare polymeric derivatives of metal phthalocyanines by heating appropriate substances in presence of metal. Introduction of metal ions into a preformed organic polymer may give useful soluble polymers. In some cases cross-linking occurs. Reactions with chelates containing functional groups are best for obtaining high-molecular-weight polymers. Polymers from vinyl ferrocene show promising thermal stability, and basic beryllium carboxylates and aluminium alkoxide derivatives of acetyl acetone and ethyl acetoacetate have been polymerised. Theoretical aspects of the stability of these polymers are discussed and W.R.M. 20 references are given.

Comment on the Fringed Fibril Theory of Structure in Crystalline Polymers

R. I. C. Mitchie, A. Sharples, and R. J. E. Cumberbirch J. Polymer Sci., 42 (Feb 1960) 580-581 The authors prefer the concept of short, discontinuous crystallites to J. W. S. Hearle's (J.S.D.C., 74 (1958) 562)) suggestion of a continuously crystalline fibrillar skeleton joined in a network by fibril branching and by individual molecules passing from one fibril to another.

Siliceous Pigments For Rubber Columbia-Southern Chemical Corpn.

BP 841,156 (U.S.A. 14 Oct 1955) Hydrated silica treated with an organo-metallic complex formed from chromic or zirconium chloride and a carboxylic acid preferably of $< 24\,\mathrm{C}$ when used with rubber causes no diminution in abrasion resistance C.O.C.

Preventing Discoloration of Polyamides by Natural or Artificial Food Dyes

Inventa AG. für Forschung und Patentverwertung

BP 839,566 (Switzerland 24 Oct 1955) Cups, bottles, spoons, etc., made of uncoloured or pigmented polyamides are treated with an organic substance having dye-like affinity for the polyamide and which selectively absorbs electromagnetic radiation in a

region outside the visible spectrum, e.g. Erional NW (Gy) (a naphthalene sulphonic acid-oxydiarysulphone-formaldehyde condensate) or Nylotan (S). This gives the treated article complete freedom from being stained by coloured fruit juices and tea even after being boiled for 30 min. Light scratching of the surface does not impair the resistance to staining. C.O.C.

Polymers of Unsaturated Carbamato Ethers and Thioethers

Rohm & Haas BP 840,891 (U.S.A. 15 July 1955) Compounds of formula—

CH₂:CHYAO·CO·NR¹R²

(Y = 0 or 8; A = cyclohexylene, alkylene of 2–10 C forming a bridge of < 2 C between Y and 0, or alkylene having a chain intercepted by 0 so that in YAO every two adjacent hetero atoms are separated by alkylene of 2–4 C of which at least two C form a chain between the hetero atoms; R^1 and R^2 together = tetramethylene, pentamethylene or 3-oxapentamethylene or R^1 = HC_6H_5 or Alk of 1–6 C and R^2 = H, cyclohexyl, phenyl, chlorophenyl, naphthyl, benzyl, oleyl or Alk of 1–22 C) readily polymerise to yield products having a very wide field of use including resin finishes, modifiers for fibre-forming polymers, coating and impregnating agents. Thus 2-vinyloxyethyl-N-carbamate when heated at 60°c. with HCHO yields the water-soluble 2-vinyloxy-ethyl N-ethyl-N-methylol carbamate, which is used for imparting crease-recovery properties to viscose rayon cloth. C.O.C.

Dyes for Plasticised Polyvinyl Chloride, Nitrocellulose Lacquers and Printing Inks FH BP 839,634 (Germany 6 July 1955)

The dyes obtained by treating perylene-3,4,9,10-tetra-carboxylic acid with an aromatic amine containing an ether grouping, are especially useful for colouring plasticised polyvinyl chloride. When used in nitrocellulose lacquers they have excellent fastness to light and very good fastness to overlacquering. In bakeable lacquers they show no tendency to bloom even when used in very low concentration. Thus polyvinyl chloride, dioctyl phthalate and dibutyl phthalate are mixed at 100°c. with TiO₂ (C.I. Pigment White 6) and the dye obtained from perylene-3,4,9,10-tetracarboxylic acid and 4-methoxyamiline. After 15 min. the sheet is removed from the mixing rollers and gelatinised in a press at 170°c. The product is bluish red. It has excellent fastness to light and a similar uncoloured sheet kept in contact with it for 15 hr. at 100°c. shows no signs of staining. C.O.C.

Sulphurous Acid or Alkali Metal Sulphites as Stabilising Agents for Polymeric N-Vinyl Pyrrolidones

General Aniline BP 836,831 (Germany 27 Dec 1955) 0-2-1·14% on the weight of the polymer of SO₂, H₂SO₃ or an alkali-metal sulphite is used to prevent discoloration of the polymer when heated, e.g. during spray drying or when added to acrylic spinning solutions to improve the dyeing properties of fibres formed from them. C.O.C.

Polymeric Materials from Polyesters and Organic Polyisocyanates

ICI
BP 839,189 (4 Mar 1955)
Polyesters and organic polyisocyanates together with a
paste formed from a filler, colorant or flameproofing agent
and a liquid are injected simultaneously or consecutively
into a mixing chamber. The resulting liquid continuously
flowing from the chamber is shaped into blocks, continuous
sheets, articles, etc.
C.O.C.

Cross-linked Copolymeric Polyesters for Surface Coatings and Films

General Aniline BP 837,926 (U.S.A. 19 Apr 1957)
A product yielding water-soluble films of excellent properties is readily prepared by diesterifying methyl vinyl ether-maleic anhydride copolymer with 2-butene-1,4-diol to yield a copolymeric polyester which in presence of N-vinyl-2-pyrrolidone and heat becomes cross-linked. C.O.C.

Ensuring Uniformity of Treatment of Polyethylene Film by Corona Discharge Celanese Corpn. of America

BP 842,104 (U.S.A. 21 Nov 1955)
When using treatment with corona discharge to improve
the printability of polyethylene film, presence of a capacitor

effectively in series with the electrodes and the source of current ensures uniform treatment of the film even when its width is many feet.

C.O.C.

Depigmenting Alkenyl Aromatic Polymer Compositions Dow Chemical Co. USP 2,914,492 (5 Apr 1957)

Dow Chemical Co. USP 2,914,492 (5 Apr 1957) The composition is dissolved and then a little acetic acid or other aliphatic carboxylic acid of < 6 C and a diatomaceous earth is added. This causes the pigment to settle out as curds which can be filtered off to leave a clear solution of the polymer. C.O.C.

Polymerisation Oven using Propane as Fuel (I p. 596)

Polymers and Copolymers of N-(β-Trichloro-α-oxyethyl)amides of αβ-Unsaturated Mono- or Dicarboxylic Acids (III p. 598)

Sodium Aluminium Silicates as Fillers, Flatting Agents, Paint Extenders, etc. (III p. 598)

Pigment Compositions for the Mass Coloration of Polyesters and Polyamides, Coating Compositions, Moulded and Extruded Products (IV p. 604)

Dynamic Mechanical Properties of some Polyamides (VI p. 606)

Dynamic Mechanical Properties of Nylon (VI p. 606)

Sorption of Water by Nylons (VI p. 606)

Molecular-weight Distribution of Nylon 6.6 (VI p. 606)

Proton Magnetic Resonance of Polyhexamethylene Adipamide (VI p. 606)

X-ray Diffraction Studies of Crystallinity in Polyethylene Terephthalate (VI p. 606)

Resin Finishing of Cellulose (X p. 611)

Baking of Resin Finishes-II (X p. 611)

Attack by Moths of Cellulose, Films and Bags of "Mothproof" Plastics (XI p. 612)

Coating Moving Web with Liquids (XI p. 613)

XIV-ANALYSIS; TESTING; APPARATUS

Rheological Measurement of Free-flowing Materials R. R. Myers Off. Dig. Fed. Soc. Paint Technology, 32 (May 1960) 572-590

To characterise the mechanical behaviour of freeflowing materials it is essential to measure viscosity at rest, residual viscosity at infinite shear, and the shear-thinning index (ease of thinning). This necessitates an instrument or instruments capable of (i) detecting subtle evidences of structure at shear rates so low that an extrapolation to zero shear can be made reliably; and (ii) progressing through an intermediate range of shear rate sufficiently broad to permit calculation of the shear-thinning index. High shear measurements are not necessary for studying structural features, but they often reveal the behaviour pattern of a material under conditions of application, e.g. the behaviour of dispersions in high-speed film application. Problems of measurement are created by the destructive character of conventional measurements, and by the non-linearity of the relation between applied stress and resultant shear. Since the object of any rheological measurement is the evaluation of parameters involved in the stress-shear relation, the complexity of this relation determines the number of material constants that must be evaluated. The approach based on shear rate requires at least three constants; when the base of the rheological equation of state is broadened to include deformation as well as shear rate, it becomes possible to express mechanical behaviour in-terms of only two constants. Ultrasonic methods are potentially useful as non-destructive means of mean J.W.D.

Electrophoretic Mobilities of Aromatic Compounds

J. Chromatography, 4 (July 1960) D 2-D 3
Data giving the electrophoretic mobilities of a series of
aromatic epd., using 3 x-ammonium hydroxide and
N-acetic acid as electrolytes, obtained from J. Franc and

M. Wurst, Collection Czechoslov. Chem. Communs., (1959) 857, originally published in *Chem. listy*, **52** (1958) 1474, are given in tabular form. Cpd. examined include aromatic carboxylic acids, aldehydes, amines, phenols, nitro-deriv. and naphthylamine- and naphthol-sulphonic acids.

Rf Values of Some Phenolic Compounds

J. Chromatography, 4 (July 1960) D 6 R_f values of a number of amino- and nitro-phenols have been tabulated from data by C. Madhosingh, Ph.D. Thesis, University of Western Ontario, London, Canada (1959). Three solvent systems and four detecting agents were used. R_f values include those of 2-amino-4-nitrophenol $\rightarrow \beta$ -naphthol and 4-amino-2-nitrophenol $\rightarrow \beta$ naphthol.

Selective Spray Reagents for the Identification and Estimation of Flavonoid Compounds Associated with Condensed Tannins

D. E. Roux and A. E. Maihs

J. Chromatography, 4 (July 1960) 65-74 Iron alum, ammoniacal silver nitrate, bis-diazotised benzidine, vanillin-toluene-p-sulphonic acid and toluenep-sulphonic acid soln, were used as selective spray reagents to give colour reactions which provided information on the A and B phenolic nuclei and the heterocyclic ring in flavonoid compounds. This information, together with R_f values in two solvent systems, was used to identify tentatively a number of flavonoids. Benzidine and ammoniacal silver nitrate were used in two-dimensional paper chromatography with a simple densitometer to estimate flavonoid substances present in tannins and also the yield of phenols resulting from degradation of flavonoids tannins. The benzidine reagent allows for the estimation of flavan-3-ols and flavan-3,4-diols in the phloroglucinol series in the presence of their counter-parts in the resorcinol series. Factors in the correlation of structure and chromatographic behaviour of flavonoid epd. are also described.

Identification of Organic Compounds. Paper Chromatographic Separation and Identification of Aminoanthraquinones

J. Gasparië J. Chromatography, 4 (July 1960) 75-79 R_I values of 24 aminoanthraquinone deriv. and the following dyes, C.I. Solvent Blues 11, 12 and 13, C.I. Solvent Green 3, C.I. Solvent Red 52, C.I. Solvent Violet 13, and unsulphonated C.I. Mordant Black 13, C.I. Acid Black 48, and unsulphonated Toluidine Blue (C.I. 63340) have been found. Four solvent systems using Whatman paper No. 3 were employed: (a) impregnation with 1bromonaphthalene, eluting with 1:1 or 2:1 pyridine/ water soln. and (b) impregnation with formamide, eluting with toluene or chloroform. At least eight impurities were found in technical 2,6-diaminoanthraquinone, including 1- and 2-aminoanthraquinone and 1,2- and 2,7-diaminoanthraquinone. The chemical structure of these dyes and their related chromatographic behaviour are discussed.

Paper Chromatography of Textile Dyes
J. Jungbeck S.V.F. Fachorgan, 15 (June 1960) 417-429
A short history of paper chromatography is followed by
an explanation of the theory and of the experimental
methods used. The effect of different papers, solvents, etc., is discussed, and then the chromatography of dyes. After some notes on extraction of dyes from fibres, tables of Rf values for dyes of several dyeing classes (acid, afterchrome, and chrome complex, disperse and direct) are given, together with lists of developing solvents suitable for these single dye classes. Finally, the relation between chemical constitution, R_f value and developing solvent is discussed. P.B.S.

Paper Chromatographic Separation of Direct Cotton and Acid Wool Dyes

Textil-Rund., 15 (July 1960) 353-374 L. Meckel A statement of the problem of analysis of dye mixtures is followed by an account of the principles and develop-ment of paper chromatography and of the methods employed. The methods used up to the present time for separating dye mixtures are presented. Then experimental details for chromatography are given, starting with the dye in substance or on the fibre. The use of glass-fibre paper

and of acetylated paper is detailed, together with many developing solvents and chromatographic apparatus. few dyes are used for the experiments and photographs (black and white) of the chromatograms are given.

Complexometric Determination of Total Zinc and Zinc Oxide in Lithopone (C.I. 77115) A. Schaller and E. Mihalovics

Osterr. Chemiker-Ztg., 60 (1959) 338-344 Chem. Abs., 54 (25 May 1960) 10347 Review, 20 references.

"Soluble Lead" Content of Lead Chromes J. R. Rischbieth

J. Oil Col. Chem. Assocn., 43 (Aug 1960) 594-605 When lead chromes are extracted with 0-68 N-HCl, then if extraction proceeds to equilibrium, increasing amounts of any chrome, as with a mechanical mixture of its components, will dissolve completely in a given volume of the acid until the solubility product of Pb chromate is reached in the solution. The amount of Pb then extracted is a function of the ratio of total lead to total chromate in the material being extracted. Once the chrome is present in excess, its solubility properties depend on its chemical composition and perhaps in some cases on its physical properties also. Orange chromes (C.I. 77601) behave as mechanical mixtures of their two components. portion will be completely extracted and, as the amount of excess chrome increases, the extracted lead increase approximately in proportion, until the acid is consumed. The amount of lead extracted from middle chromes, where these consists of pure lead chromate (C.I. 77600), will be independent of the amount in excess. The situation with Lemon and Primrose Chromes (C.I. 77603) is more complicated. The amount of Pb extracted will be independent of the amount of excess chrome only if the mixed crystals are homogeneous and no true or surface recrystallisation takes place in the acid solution. On the other hand, if the mixed crystals were to recrystallise completely the chrome would behave as a mechanical mixture of its components and, as the excess amount is increased, the amount of Pb extracted will increase until the solubility product of PbSO₄ is reached in the solution. Soluble Pb impurities, e.g. Pb nitrate or acetate, have little effect on the amount of Pb extracted from Orange Chrome, but such impurities in Middle Primrose and Lemon Chrome will cause the amount of Pb extracted to exceed the limiting value mentioned above if sufficient chrome is extracted. Mixing chromes with insoluble diluents reduces the amount of chrome being extracted and thus explains why mixing Lemon Chrome with an insoluble diluent does not reduce the "soluble lead" content proportionately. The "soluble lead" content of mixtures containing the chromes used in this work was predicted with reasonable accuracy from two, or at the most three, determinations on the original

Analysis of Fibre Blends

T. Szentpály, R. Szentpály, and A. Stark

Faserforsch, und Textiltech., 11 (Apr 1960) 189-195 quantitative determination of the following 7 fibres is discussed: cotton, viscose rayon, wool, polyamide, polyacrylonitrile, Ardil, and Merinova (vegetable protein). Mixtures containing 2, 3, or 4 components are considered. Methods using suitable solvents for separation are described.

Light-scattering Measurements on Selected Nylons H. C. Beachell and D. W. Carlson

J. Polymer Sci., 40 (Nov 1959) 543-549
Molecular weights, second virial coefficients, and
molecular dimensions of nylons 6, 6.6, and 6.10. P.T.S.

Relation of Apparent Diffusion Coefficient to Time of Half-dyeing (VIII p. 608)

Testing in the Laboratory of Chemically Aftertreated Polycaprolactam Staple Fibres (X p. 611)

Finishing with Epoxy Resins (X p. 611)

Infrared Spectra of Crystalline Polysaccharides (XI p. 612) Spectra of Irradiated Polyamides (XIII p. 614)

Infrared Spectra and Crystal Structures of Polyamides (XIII p. 614)

AQUEOUS PIGMENT PRINTING COLOURS

for prints with a REALLY soft handle
particularly advantageous for printing on

NYLON & TERYLENE

FREEDOM from TACK
Eliminates danger of marking-off
QUICK DRYING
Allowing maximum production

* Bribliant Shades

* Low-cost Binder

White AL. for the best matt white

for full details apply to:-

TENNANTS TEXTILE COLOURS LTD.

35/43 Ravenhill Road, Belfast or to the Area Distributors

AP204IM

Quick Octing Pressure Covers

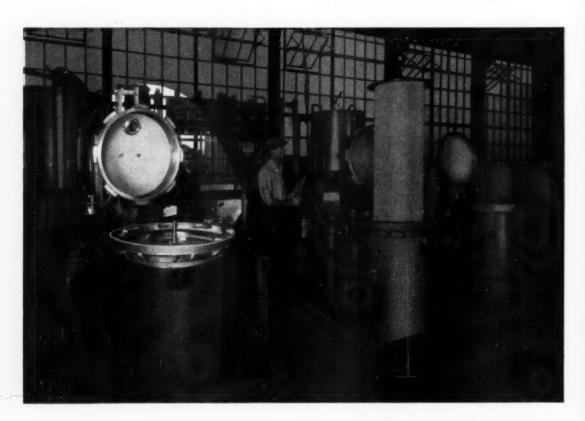
LONGCLOSE quick-acting pressure covers are available for various sizes of pressure dyeing and drying machines.

These covers are accurately counterbalanced and are secured and released by turning one handwheel only.

The sealing element is specially designed for safe and efficient operation independent of any external pressure source.

The illustration shows a coupled pair of LONGCLOSE High Temperature Single Beam Pressure Dyeing Machines fitted with quick-acting pressure covers.

Fully descriptive literature sent on request.



Crescent Works Dewsbury Road LEEDS 11
Telephone Leeds 77261 Cables MACHINES LEEDS

A member of the Stone-Platt Group



APPOINTMENTS

All inquiries relating to Advertisements should be addressed to The General Secretary, The Society of Dyers and Colourists, Dean House, 19 Piccadilly, Bradford 1, Yorkshire.

Replies may be addressed Box-, The Society of Dyers and Colourists, Dean House, 19 Piccadilly, Bradford 1, YORKSHIRE, where all communications relating to these Advertisements are treated in strict confidence.

APPOINTMENTS VACANT

A USTRALIA. Chemist for Melbourne and Technical Salesman (car provided) for Sydney. Age 25-40 years. Knowledge of textile or leather or paint technology important. Salary ranges £A1500 upwards per year plus bonuses. Superannuation.

Edgar I. Noble & Co. Pty. Ltd., Flockhart Street, Abbotsford, N.9,

POTHERGILL & HARVEY LTD, require for their Research and Povelopment Department a CHEMIST to assist in the development of processes, for the treatment of fibreglass and other synthetic textile fabrics. Whilst the work will be mainly in the laboratory, the successful applicant will be expected to follow development through the pilot plant to the production stage. Applicants should possess the Higher National Certificate or equivalent qualifications and a knowledge of resin chemistry would be an advantage. Age preferably 23–30 years. The usual staff conditions are applicable and salary will be according to qualifications and experience. Please apply to the Personnel Officer, Fothergill & Harvey Ltd., Sladen Wood Mill, Littleborough, Lancashire.

COTTON PIECE GOODS DYEING AND FINISHING RAYON AND SYNTHETIC PIECE GOODS DYEING AND FINISHING

In order to keep its establishments in Lancashire and Yorkshire at full strength after recent and pending retirements of staff,
THE BRADFORD DYERS ASSOCIATION LIMITED invites applications from first-class candidates who are qualified by training and experience to fill one of the following positions in either of the above Sections—

WORKS MANAGER CHEMIST FOREMAN FINISHER MARKET REPRESENTATIVE

Replies, which will be treated with strict confidence, should give details of age, education, qualifications, experience and salary required, and be addressed, marked 'CONFIDENTIAL', to The Secretary, The Bradford Dyers' Association Limited, 39 Well Street, Bradford, I. Originals of testimonials should NOT be enclosed.

TECHNICAL DYER required by Bradford firm engaged in hank yarn and slubbing dyeling of synthetic fibres. Superannuation Street, Bradford 1.

Street, Bradford 1.

TECHNICAL SALES REPRESENTATIVE required for dyes and chemicals to the Textile Dyeing and Finishing Trade in the Lancashire area. This position affords good salary with prospects to suitable applicant. Superannuation and Bonus Schemes, Car pro-

Videa.

Apply in confidence to The Manager, Allied Colloids Ltd., Bolton Road, Farnworth, Lancashire.

THE CHEMICAL SOCIETY VACANCY FOR SENIOR ASSISTANT LIBRARIAN

VACANCY FOR SENIOR ASSISTANT LIBRABIAN
THE CHEMICAL SOCIETY invites applications for the post of
Senior Assistant Librarian. Candidates aged 25-35 with good
knowledge of chemical literature and experience in industrial or other
special library preferred. Initial salary £1000-£1400 (scale now under
revision). Further details from the General Secretary, The Chemical
Society, Burlington House, London W.1, by whom completed
applications must be received before 14th November 1960.

WANTED by Midlands Worsted Spinners and Dyers, a Foreman Dyer for night-shift work. Excellent wages and prospects. House provided if required. Apply Box V208 giving full details of age, experience, etc.

YARN DYER, with experience in the application of fast dyes to wool required by a medium size Leicester firm. Excellent salary for the right applicant. Pension scheme, and assistance given if disturbance necessary.

Box V209

YARN DYERS. Further vacancies occur for experienced Package Dyers, skilled in dyeing synthetic blends, in a modern plant which is being expanded. The conditions are excellent and a superannuation scheme is operated.

If you are interested, send details of your education, training and experience to the Managing Director, Stevensons (Dyers) Ltd., Amber Dye Works, Ambergate, Derbyshire.

YOUNG GRADUATE CHEMIST required in N.W. London for research and development in connection with new duplicating and copying processes. A knowledge of dyestuff chemistry advantageous but not essential. Full details, including qualifications, experience, age, and salary required to Box V210.

APPOINTMENT WANTED

MANAGER/DYER, age 26, married, seeks progressive technical or Madministrative position. C and G Full Technological Cert. Experienced hank, pressure dyer, cloth dyeing and finishing of cotton and synthetics.

Box W634

THE INTERNATIONAL WOOL SECRETARIAT

Plans to extend its liaison activities with the wool industry and seeks

TWO DEVELOPMENT OFFICERS

Candidates should have degree in textiles or equivalent or A.T.I., and at least 5 years varied industrial experience preferably in finishing.

Duties will include hisison work with the wool industry, particularly the introduction of new processes and their development under mill conditions. These activities will be largely in the West Riding and those appointed will reside there.

Commencing salary in the range of £1000-£1500 p.a. according to experience, etc.; there is a superannuation scheme.

Applications should be marked Confidential and addressed to-

Ref. D.S. International Wool Secretariat Dorland House 18-20 Regent Street London S.W.1

COURTAULDS

Textile Printing Technologist

COURTAULDS requires a Textile Printing Technologist for its Service and Development Dyehouse at Spondon, Derbyshire.

The work will involve development and technical service work in all aspects of textile printing. A flair for interpreting designs and an ability to see ideas through to a successful conclusion are essential. This is a key appointment with scope for growing responsibilities.

A university degree or equivalent is expected, though exceptional experience could be a substitute.

Candidates should write for a detailed form of application to the Director of Personnel, Courtaulds Limited, 16 St. Martin's-le-Grand, London, E.C.I, London, E.C.1, quoting reference M16.

Appointments Vacant - continued

DYEING and FINISHING MANAGER

for an old-established and progressive textile company employing 1200 people and situated in an exceptionally pleasant area in the South of England. Starting salary not less than £2000 p.a., plus pension scheme, other benefits and, after an initial period of service, profits participation. Preferred age 35-45.

The Dyeing and Finishing Manager will be responsible to the Works Superintendent for a staff of over 130 people employed in the dyeing and finishing of silk, nylon and other synthetic knitted and woven materials, including narrow fabrics. He will have full control of his department within his agreed operating budget and general company policy. Every opportunity will be given to visit other organisations at home and abroad in order to keep up-to-date with current development.

Desired qualifications include ATI or membership of the Society of Dyers and Colourists allied with wide practical and managerial experience of dyeing synthetic and cotton fabrics for the medium to better-class trade. A knowledge of crease-resist processes would be of advantage.

Please write briefly in first instance, quoting Reference No. 785, to-



ASHLEY ASSOCIATES LIMITED

Received to advise on this appointment

THE STRICTEST COMPIDENCE WILL BE CHMERVED AND NO DETAILS OF CARDIDAT WILL BE PASSED TO CLIENTS WEMOUT CANDIDATES PERMISSION

MEMBERS' CHANGES OF ADDRESS-continued from page vi

Farrar, H. E., formerly of The Calico Printers Association Ltd., Strines Print Works, Strines, near Stockport, Cheshire, to Birch Vale Print Works, Birch Vale, near

Stockport, Cheshire
Fintelmann, H. U., formerly of 11 Sunningdale Avenue,
Sale Moor, Cheshire, to Messrs. Industrial Dyestuffs Ltd., Bonding House, 26 Blackfriars

Manchester 3

Forsyth D., formerly of 23 Ardenlea Street, Dalmarnock, Glasgow S.E. to 3 Sommerville Terrace, Murray VII, East Kilbride, Lanarkshire

East Kilbride, Lanarkshire
Franck, E., formerly of Danish Textile Research Institute,
83 Solvgade, Copenhagen, Denmark, to Danish Textile
Institute, 5 Stokhusgade, Copenhagen K, Denmark
Ghionis, Constantin Dr. Rer. Nat., formerly of Ludwigshafen A.Rhein, Pranckh-Str. 30, West Germany, to
937 South 31st Street, Milwaukee, Wisconsin, U.S.A.
Goodwin, J. E., formerly of Brodawel, Llanfaes, Beaumaris,
Anglesey, North Wales, to clo La Bernalesa, Lamadrid
Esq., Condarco, Bernal, F.N.G.R., Buenos Aires,
Argentina, South America
Grushka, J., formerly of Bet Reznik, Shderot Bialik, Ramat

Grushka, J., formerly of Bet Reznik, Shderot Bialik, Ramat Hasharon, Israel, to c/o Bradford Cotton Mills Ltd., P.O. Box 64, Maitland, N.S.W., Australia Gupta, M. L., formerly of 18 Monton Street, Manchester 14,

to 60 Cawdor Road, Fallowfield, Manchester 14 Hall, W. M., formerly of 33 Leopold Road, Waterloo, Liverpool 22, to 6 Yew Tree Close, Woodchurch, Birkenhead, Cheshire

Hannah, T. B., formerly of 89 Fereneze Avenue, Clarkston, Renfrewshire, to 33 Gloucester Avenue, Clarkston,

Glasgow W., formerly of 6 Ashcombe Road, Cheddleton, Harden, C

near Leek, Staffordshire, to Mill House, High Street, Crolborne, near Warrington, Lancashire

Harmsworth, G. L., formerly of Rhianfa, Curley Hill, Ilkley, Yorkshire, to Alliance Dye & Chemical Co. Ltd., Grecian Mill, Lever Street, Bolton, Lancashire

Hart, H., formerly of Carr-end, Carr Green Lane,
Dalton, Huddersfield, to Isaac Robson & Sons Limited,
Dalton Dye Works, Huddersfield
Hulliand G. S. Green Lane, G. Whitespeech, 130, Hinchley,

Helliwell, G. S., formerly of Whitecroft, 139 Hinckley Road, Kirby Muxloe, Leicestershire, to Samuel Pegg & Son Ltd., Barkby Road, Leicester

Hepworth, J. A., formerly of 16 Parkfield Road, Cheadle Hulme, Cheshire, to Shell Chemical Company Ltd., 144-146 Deansgate, Manchester 3

Hewitt, J. W., formerly of 720 Manchester Road, Bury, Lancashire, to 5 Coniston Grove, Heaton, Bradford 9

Hill, B., formerly of British Cotton & Wool Dyers Association Ltd., 22 Cumberland Street, Manchester 3, to c/o British Cotton & Wool Dyers' Association Ltd., Cumberland House, Lissadel Street, Pendleton, Salford 6

Hurst, E. J., formerly of 21 Coop Street, Astley Bridge, Bolton, Lancashire, to 7 Chelford Avenue, Sharples, Bolton, Lancashire

Johnson, E. L., formerly of 28 Kingsway, Alkrington, Middleton, Manchester, to 20 Hardman Avenue, Prestwich, Manchester

Kay, E. A., formerly of The British Cotton & Wool Dyers' Association Ltd., 22 Cumberland Street, Manchester 3, to c/o British Cotton & Wool Dyers' Association Ltd., Cumberland House, Lissadel Street, Pendleton, Salford 6

Knibbs, P., formerly of The British Cotton & Wool Dyers'
Association Ltd., 22 Cumberland Street, Manchester 3,
to c/o British Cotton & Wool Dyers' Association Ltd.,
Cumberland House, Lissadel Street, Pendleton,

Lawson, R., formerly of 1 Station Road, Burghead, Moray-shire, Scotland, to 3 Nethercliffe Road, Guiseley, near Leeds, Yorkshire

Lindley, F. B., formerly of Bonnyhill Cottage, 31 William Street, Johnstone, Renfrewshire, Scotland, 10 Hill-crest, 111 Aurs Road, Barrhead, Renfrewshire

McInnes, A. A., formerly of 64 Grangefield Crescent, Castlereach Road, Belfast, to 41 St. Anne's Crescent, Ballyclare Road, Carnmoney, Co. Antrim

McNish, R., formerly of 20 Valmont Road, Sherwood, Nottingham, to 23 Ribblesdale Road, Sherwood,

Nottingham

Mannion, K., formerly of British Cotton & Wool Dyers'
Association Ltd., 22 Cumberland Street, Manchester 3,

Association Ltd., 22 Cumberland Street, Manchester 3, to 33 Alice Street, Sale More, Cheshire
Marsden, J., formerly of 115 Victoria Street, Magog, Quebec, Canada, to 390A Bridge Street, Northampton, Mass., U.S.A.
Marvelly, R. D., formerly of P.O. Box 653, Dunedin, New Zealand, to P.O. Box 5168, Auckland, New Zealand
Millar, J., formerly of 21 Alexandra Road, Well End, near Barnet, Hertfordshire, to c/o Diro, 29 Shipley Common Lane, Ilkeston. Derbyshire Lane, Ilkeston, Derbyshire

Pearson, J. H., formerly of 9 Clarence Street, Paisley Renfrewshire, to 35 Primula Street, Astley Bridge, Bolton, Lancashire

Phillips, J. B., formerly of Albany House, Victoria Embankment, Durban, South Africa, to 6th Floor A.A. House, 537 Smith Street, P.O. Box 632, Durban, South Africa

Poole, R. A., formerly of 23 Dane Road, Stoke, Coventry, to

39 Arden Road, Bulkington, near Nuneaton
Postman, W., formerly of A. French Textile School,
Georgia Tech., Atlanta, Georgia, U.S.A., to The
Dow Chemical Co., Williamsburg, Virginia, U.S.A.

Raper, D. P., formerly of Casita, Chapel Lane, Hale Barnes, Cheshire, to c/o Arnold Hoffman & Co. Inc., 2130 North Tryon Street, Charlotte, North Carolina, U.S.A.

Regan, T. J., formerly of British Cotton & Wool Dyers' Association Ltd., 22 Cumberland Street, Manchester 3, to c/o British Cotton & Wool Dyers' Association Ltd., Cumberland House, Lissadel Street, Pendleton, Salford 6

Shah, K. A., formerly of Calico Mills (Dyeing Department), Ahmedabad 1, India, to 5 Aswin Society, Ahmedabad 7,

India

Slack, I. S., formerly of 1104 Henley Road, Port Credit, Ontario, Canada, to c/o Mr. K. Barden, 27 Lawrence Road, Marsh, Huddersfield, Yorkshire

Road, Marsh, Huddersfield, Yorkshire
Smith, K. S., formerly of Calico Printers Association,
Chadkirk Dyeworks, Romiley, Cheshire, to Messrs.
John Heathcoat & Co. Ltd., Tiverton, Devon
Sunol, Y. C., formerly of Y. C. Sunol, c/o Bozkurt Mensuc... Sanayii A.S., Zeytinburnu-Istanbul, Turkey, to
c/o Cukurova Sanayi Isletmeleri T.A.S., Posta
Kutusu II, Tarsus, Turkey
Sykes, Herbert, formerly of 77 Ashworth Lane, Bolton,
Lancashire, to 29 Florence Avenue, Bolton, Lancashire
Threffall, L., formerly c/o The British Cotton and Wool

Dyers' Association Ltd., 22 Cumberland Street,
Manchester 3, to c/o British Cotton & Wool Dyers'
Association Ltd., Cumberland House, Lissadel
Street, Pendleton, Salford 6

Theorems LD. George (10 Service Cold Files Delta Control C

Thompson, J. D., formerly of 10 Springfield Flats, Bolton Road, Darwen, Lancashire, to 36 Broomhill Road, Glasshoughton, Castleford, Yorkshire Toogood, C. S., formerly of 24 Sowclough Road, Stacks-

steads, Bacup, Lancashire, to 1 Glemmore Close, off Spencer Lane, Bamford, Rochdale, Lancashire Trueman, H. N., formerly of 117 Raceview, Muckamore, Co. Antrim, Northern Ireland, to Ballievey, Banbridge, Co. Down, Northern Ireland

Co. Down, Northern Ireland
Turner, J. C., formerly of 64 North Road, Croesyceiliog,
Cwmbran, Monmouthshire, to Netherhope, Hafod
Road, Ponthir, Monmouthshire
Villiers, R. F., formerly of 52 Gresham Road, Staines,
Middlesex, to 12 The Brambles, Wollercote,
Stourbridge, Worcestershire
Wainwright, P., formerly of Leeds University Union,
University Road, Leeds, to 10 Devon Mount, Leeds 2,
Vorkshire

Wilson, J., formerly of British Cotton & Wool Dyers'
Association Ltd., Central Laboratory, Cumberland
Street, Manchester 3, to c/o British Cotton & Wool
Dyers' Association Ltd., Cumberland House,
Lissadel Street, Pendleton, Salford 6
Wood, G., formerly of Rosthwaite, 76 Norfolk Street,
Glossop, Derbyshire, to 29 Leverson Crescent,
Balsall Common, near Kenilworth, Warwickshire

ANILINE AND ALIZARINE COLOURS

SOLVENTS AND CHEMICALS

HYDROGEN PEROXIDE

(CONCENTRATED)

FREE FROM ALL IMPURITIES
PROMPT DELIVERIES FROM

COLE & WILSON LTD

24 Greenhead Road HUDDERSFIELD

Telephone Huddersfield 3132/3 Telegrams COLOUR HUDDERSFIELD

Werks Common Road Bay Hall Birkby HUDDERSFIELD
Telephone Huddersfield 3132/3

J C BOTTOMLEY & EMERSON LTD

Manufacturers of

DIRECT AND UNION FAST TO LIGHT, ACID, LEATHER AND PAPER DYESTUFFS

We also specialise in the manufacture of

METACHROME DYESTUFFS

LONGROYD BRIDGE

HUDDERSFIELD

Telephone 4241 (2 lines)

The Certificate of the

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE

AMOA CHEMICAL COMPANY LTD

for their

GOLDFINCH JELLY HAND CLEANSER

The ideal hand cleanser for use in all mills, factories, workshops for a rapid and thorough cleansing of the hands

Removes oil, grease, swarf, grime, ink and many dye stains As gentle on the hands as the Goldfinch is gentle in all things

Telephone Hinckley 3725



BROWN & FORTH

FOUNDED 1890

DYESTUFFS SODIUM CHLORITE

AND ALL

CHEMICALS FOR TEXTILES

83-117 EUSTON ROAD 81 CORNBROOK STREET LONDON NWI MANCHESTER 16 EUS \$101-5 MOS 1347-8 AND AT NEW YORK

FINISHERS

Stiffness



The "SHIRLEY" Stiffness Tester enables stiffness, handle and drape to be expressed in terms of numerical values. The finisher is able to record these values which are available for future use when repeats are required.

Please send for Leaflet SDL/3aY

SHIRLEY **DEVELOPMENTS** LIMITED

40 KING STREET WEST MANCHESTER 3

Telephone DEAnsgate 5926 and 8182

Combined Reports of the Committees on the **Dyeing Properties of** Direct Cotton, Vat, and Wool Dyes

Price 5/-

Orders should be sent to the SOCIETY OF DYERS AND COLOURISTS 19 PICCADILLY BRADFORD 1 YORKSHIRE

L J POINTING & SON LTD

Established 1916

HEXHAM NORTHUMBERLAND

manufacture particularly

SPECIALITY DYESTUFFS

OILS, FATS & WAXES **VARNISHES & LACQUERS** LEATHER OF ALL TANNAGES

and

EDIBLE COLOURS

(guaranteed to meet all existing regulations)

ENQUIRIES GIVEN IMMEDIATE AND CAREFUL ATTENTION

Telephones Telegrams Hexham 942 (3 lines) POINTING HEXHAM

PIECE DYEING MACHINES for all types of fabric or piece goods in rope form



PEGG

dyeing and finishing machines

FABRICS AND PIECE GOODS



HYDRO EXTRACTORS

The "Whirlwind" offers
quick acceleration, high
speeds and thorough
extraction of all classes
of work in minimum
time.



INDEX TO ADVERTISERS

PAGE AMOA CHEMICAL CO LTD EXXIV

ANDREW ENGINEERING & DEVELOPMENT CO LTD xxiv

xvii BIP CHEMICALS LTD

J C BOTTOMLEY & EMERSON LTD xxxiv

xi BRITISH CHROME & CHEMICALS LTD

EXXV BROWN & FORTH LTD

xix CATOMANCE LTD

CIBA LTD avi

xxvi CIBA CLAYTON LTD

xxxiv COLE & WILSON LTD

II COLNE VALE DYE & CHEMICAL CO LTD

XXV FARBENFABRIKEN BAYER A G

II CHAS FORTH & SON LTD

xiv **GEIGY CO LTD**

GEIGY CO LTD XV

xii L B HOLLIDAY & CO LTD

XX HUNT & MOSCROP LTD

IMPERIAL CHEMICAL INDUSTRIES LTD vili

IMPERIAL CHEMICAL INDUSTRIES LTD

xiii LAPORTE CHEMICALS LTD

XXX LONGCLOSE ENGINEERING CO LTD

xxviii MATHER & PLATT LTD

xxxvi SAMUEL PEGG & SON LTD

L J POINTING & SON LTD

xxiii JAMES ROBINSON & CO LTD

vii SANDOZ PRODUCTS LTD ix SANDOZ PRODUCTS LTD

xviii SAUNDERS VALVE CO LTD

i SHELL CHEMICAL CO LTD

XXXV SHIRLEY DEVELOPMENTS LTD

xxii F SMITH & CO (WHITWORTH) LTD

ii STANDARD CHEMICAL CO

xxix

TENNANTS TEXTILE COLOURS LTD

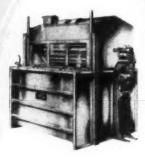
vi W P THOMPSON & CO

VINYL PRODUCTS LTD

H J B WILKINSON (CHEMICALS) LTD

xxvii YORKSHIRE DYEWARE & CHEMICAL CO LTD

PIECE DYEING MACHINES for all types of fabric or piece goods in rope form or open width.



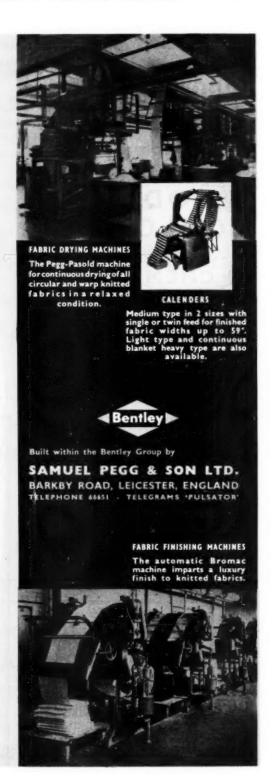
PEGG

FABRICS AND PIECE GOODS



HYDRO EXTRACTORS

The "Whirlwind" offers quick acceleration, high speeds and thorough extraction of all classes of work in minimum time.



INDEX TO ADVERTISERS

PAGE AMOA CHEMICAL CO LTD xxxiv

xxiv ANDREW ENGINEERING & DEVELOPMENT CO LTD

BIP CHEMICALS LTD xvii

xxxiv J C BOTTOMLEY & EMERSON LTD

xi BRITISH CHROME & CHEMICALS LTD

BROWN & FORTH LTD XXXV

CATOMANCE LTD xix

CIBA LTD xvi

xxvi CIBA CLAYTON LTD

xxxiv COLE & WILSON LTD

ii COLNE VALE DYE & CHEMICAL CO LTD

XXV FARBENFABRIKEN BAYER A G

ii CHAS FORTH & SON LTD

xiv GEIGY CO LTD

XV **GEIGY CO LTD**

xii L B HOLLIDAY & CO LTD

HUNT & MOSCROP LTD XX

viii IMPERIAL CHEMICAL INDUSTRIES LTD

xxi IMPERIAL CHEMICAL INDUSTRIES LTD

xiii LAPORTE CHEMICALS LTD

XXX LONGCLOSE ENGINEERING CO LTD

xxviii MATHER & PLATT LTD
xxxvi SAMUEL PEGG & SON LTD

xxxv L J POINTING & SON LTD

xxiii JAMES ROBINSON & CO LTD

vii SANDOZ PRODUCTS LTD

SANDOZ PRODUCTS LTD ix

xviii SAUNDERS VALVE CO LTD

i SHELL CHEMICAL CO LTD

XXXV SHIRLEY DEVELOPMENTS LTD

xxii F SMITH & CO (WHITWORTH) LTD

ii STANDARD CHEMICAL CO

xxix TENNANTS TEXTILE COLOURS LTD

vi W P THOMPSON & CO

VINYL PRODUCTS LTD

ii J B WILKINSON (CHEMICALS) LTD

YORKSHIRE DYEWARE & CHEMICAL CO LTD

